Service Manual



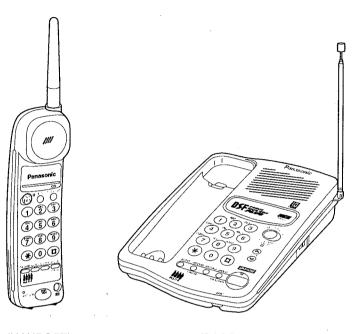
Cordless Phone

Telephone Equipment

KX-TC187AL-W

White Version

(for Australia)



■ SPECIFICATIONS

(HANDSET)

(BASE UNIT)

General

Modulation:

FM, 5 kHz Deviation

Frequency Stability:

±2.5 kHz

Dial Type: Redial:

Tone (DTMF)

Last dialed number each time the

Redial button is pressed

Pause: Memory Capacity: 3.5 seconds per pause

10 telephone numbers, up

to 16 digits per station

	Base Unit	Handset
Power Source: (Receiver Section)	AC adaptor KX-A11BAXAL (DC 12 V)	Built-in rechargeable Ni-Cd battery (PQXA36ASVC)
Receiving Frequency:	10 channels within 39.775 to 40.000 MHz	10 channels within 30.075 to 30.300 MHz
Adjacent Channel Rejection:	40 dB	40 dB
Sensitivity:	1dB μV for 20 dB S/N	2 dB μV for 20 dB S/N
(Transmitter Section)		,
Transmitting Frequency:	10 channels within 30.075 to 30.300 MHz	10 channels within 39.775 to 40.000 MHz
Jacks:	DC IN, Telephone line	
Antenna:	Telescopic	Rubber Flexible
Speaker:	2 ¹ / ₂ " (6.5 cm) PM dynamic	1 ³ / ₁₆ " (3 cm) dynamic
Microphone:	Condenser microphone	Condenser microphone
Dimensions (H×W×D):	$2^{11}/_{32}$ "×6 $^{3}/_{8}$ "×9" (60×162×229 mm)	$11^{7}/_{8}$ " $\times 2^{3}/_{16}$ " $\times 1^{23}/_{32}$ " (302 \times 56 \times 44 mm)
Weight:	1.26 lbs. (570 g)	0.51 lbs. (230g) with battery

Design and specifications are subject to change without notice.

Panasonic

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MARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians.

Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

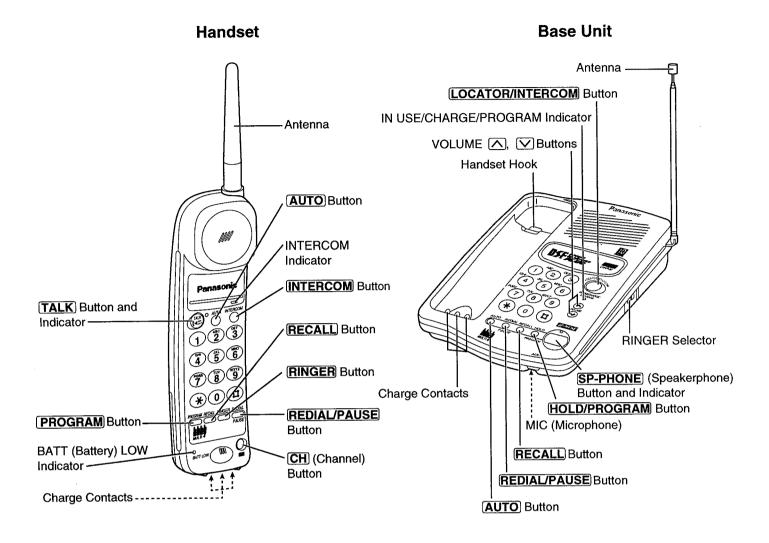
When repairing, the following precautions will help prevent recurring malfunctions.

- 1. Cover plastic parts boxes with aluminum foil.
- 2. Ground the soldering irons.
- 3. Use a conductive mat on worktable.
- 4. Do not grasp IC or LSI pins with bare fingers.

TABLE OF CONTENTS

	· · · · · · · · · · · · · · · · · · ·
LOCATION OF CONTROLS 3	SCHEMATIC DIAGRAM (HANDSET)31
STANDARD BATTERY LIFE3	ADJUSTMENTS (HANDSET)32
CONNECTION 4	RF SPECIFICATION33
OPERATIONS 5, 6	HOW TO CHECK THE HANDSET SPEAKER33
DISASSEMBLY INSTRUCTIONS 7	BLOCK DIAGRAM (BASE UNIT)34
HOW TO REPLACE FLAT PACKAGE IC 8	NEW CIRCUIT OPERATION (BASE UNIT)35
CPU DATA (BASE UNIT)9	NORMAL CIRCUIT OPERATION (BASE UNIT) 36~44
CPU DATA (HANDSET)10	BLOCK DIAGRAM (HANDSET)45
EXPLANATION OF IC TERMINALS(BASE UNIT) 11,12	NEW CIRCUIT OPERATION (HANDSET)46~49
EXPLANATION OF IC TERMINALS(HANDSET) 13,14	NORMAL CIRCUIT OPERATION (HANDSET)50
EXPLANATION OF CPU DATA	TROUBLESHOOTING GUIDE51
COMMUNICATION 15~19	TROUBLESHOOTING GUIDE (BASE UNIT) 52~54
ADJUSTMENTS (BASE UNIT) 20,21	TROUBLESHOOTING GUIDE (HANDSET) 55, 56
TERMINAL GUIDE OF IC'S,	CABINET AND ELECTRICAL
TRANSISTORS AND DIODES22	PARTS LOCATION (BASE UNIT) 57
FREQUENCY TABLE 23	CABINET AND ELECTRICAL
CIRCUIT BOARD (OPERATION)24	PARTS LOCATION (HANDSET)58
CIRCUIT BOARD AND WIRING	ACCESSORIES AND PACKING MATERIALS 59
CONNECTION DIAGRAM (BASE UNIT) 25, 26	EXTENSION CABLE CONNECTING METHOD 59
SCHEMATIC DIAGRAM (BASE UNIT)27	REPLACEMENT PARTS LIST (BASE UNIT) 60~65
CIRCUIT BOARD AND WIRING	REPLACEMENT PARTS LIST (HANDSET) 66~69
CONNECTION DIAGRAM (HANDSET) 28~30	

LOCATION OF CONTROLS



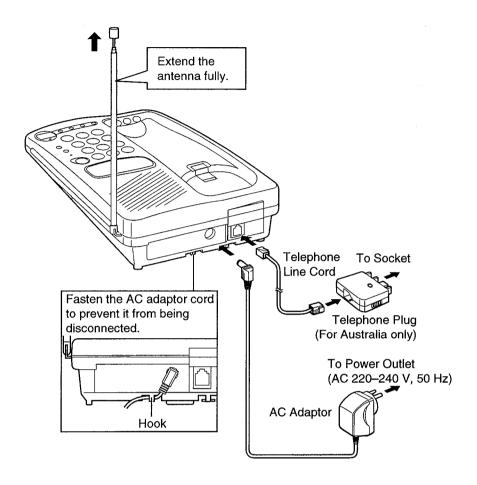
STANDARD BATTERY LIFE

If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 8 hours
While not in use (Stand-by)	Up to about 20 days

- Battery life may vary depending on usage conditions and ambient temperature.
- Clean the handset and the base unit charge contacts with a soft dry cloth once a month. Clean more often if the unit is subject to grease, dust or high humidity. If not, the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until the BATT LOW indicator flashes. This will maximize the battery life.
- The battery cannot be overcharged.

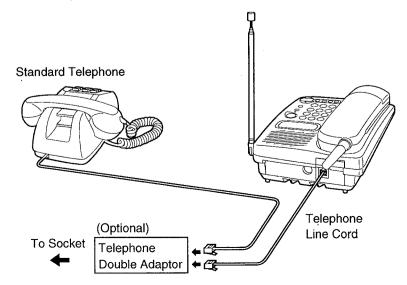
CONNECTION



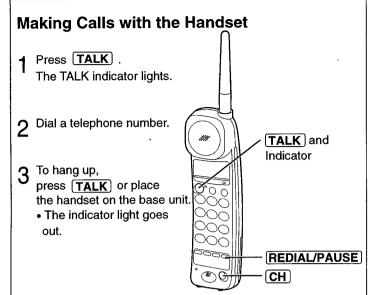
- USE ONLY Panasonic AC ADAPTOR KX-A11BAXAL.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- KX-TC187AL-W is not designed to be used with rotary (pulse dialling) services.

Adding Another Phone

This unit will not function during a power failure. To connect a standard telephone on the same line, use a telephone double adaptor.



OPERATIONS



• If an alarm tone sounds in step 1, move closer to the base unit or place the handset on the base unit. Then try again.

To redial the last number dialled on the handset

Press TALK REDIAL/PAUSE.

If noise interferes with the conversation

Press (CH) to select a clearer channel or move closer to the base unit.

Back-lit

The handset dialling buttons will light while dialling and flash when a call is received. The light will go out about 10 seconds after dialling or answering a call.

Luminous Talk Kev

The TALK button uses non-radioactive luminescent material which can absorb light energy of sunlight or lamps (incandescent, fluorescent, halogen, etc.) and release this absorbed light for darkened room operation.

- As the absorbed energy in the TALK button material decreases, the button brightness will fade naturally.
- Button brightness and duration depends on the amount of room lighting and exposure time.

Making Calls with the Base Unit

Press SP-PHONE . The SP-PHONE indicator lights.

SP-PHONE Dial a telephone number. and Indicator HOLD/PROGRAM When the other party answers, talk into the MIC (microphone). To hang up, press SP-PHONE .

VOLUME . V

MIC

 The indicator light goes out.

REDIAL/PAUSE To adjust the speaker volume (12 levels) while talking

To increase, press **VOLUME** . To decrease. press VOLUME V.

During the speakerphone operation:

- For best speakerphone performance, use in a quiet room and talk alternately with the caller.
- If the other party has difficulty hearing you, press VOLUME
- to decrease the speaker volume. Reducing the speakerphone volume will increase the microphone sensitivity.
- While using the speakerphone, if the handset is on the base unit, you may switch to it by lifting it up.

To redial the last number dialled on the base unit

Press SP-PHONE REDIAL/PAUSE.

To put a call on hold

Press HOLD/PROGRAM .

- The SP-PHONE indicator flashes.
- After 6 minutes, warning tones will sound every 10-15 seconds. After a total of 10 minutes, the call will be disconnected.

To release the hold

From the base unit, press SP-PHONE .

From the handset, press [TALK] or lift the handset off the base unit.

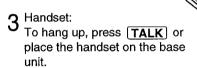
• If another phone is connected on the same line, you can also release the hold by lifting its handset.

Simultaneous Keypad Dialling

You can use the base unit like a standard telephone. After pressing **TALK** to make a call with the handset near the base unit, you can also dial using the base unit keypad.

TALK

- 1 Handset: Press TALK .
- 2 Base unit:
 Dial a telephone number while hearing a dial tone with the handset.
 - When the other party answers, talk using the handset.



Simultaneous Keypad Dialling is available only after pressing **TALK**).

Useful information

You can enter numbers using the base unit keypad for example, to access an answering service, electronic banking service, etc.

- 1. Handset: Press **TALK** .
- Handset:
 Dial a telephone number.

 You may also dial with the base unit keypad.
- Base Unit:
 Enter the required numbers while listening to the pre-recorded instructions.
- Handset:
 To hang up, press TALK or place the handset on the base unit.

Answering Calls With the Handset

If the handset is off the base unit, press $\boxed{\text{TALK}}$.

You can also answer a call by pressing any dialing button
to 9, *
or #



OR

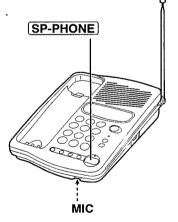
(-Any key Talk).

If on the base unit, just lift up.

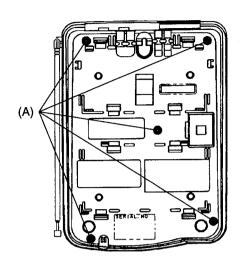


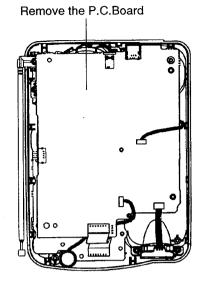
With the Base Unit

- 1 Press SP-PHONE .
- 2 Talk into the MIC.
- 3 To hang up, press SP-PHONE .



DISASSEMBLY INSTRUCTIONS





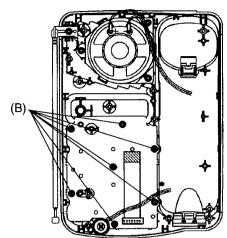
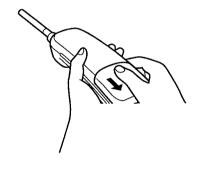


Fig. 1

Fig. 2

Fig. 3



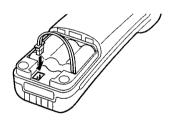


Fig. 4

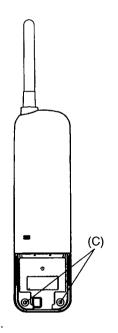


Fig. 5

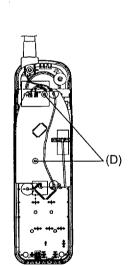


Fig. 6

Ref. No.	Procedure	Shown in Fig.—	To remove—.	Remove—.
1	1	1	Lower Cabinet	Screws (3×14)(A)×5
2	1, 2	2	Main Printed Circuit Board	Remove the P.C.Board
3	1, 2, 3	3	Operation Printed Circuit Board	Screws (3×10)(B)×7
4	4, 5	4	Rear Cabinet	Remove the battery compartment cover
5		5		Screw (2.6×12)(C)×2
6	4~6	6	Printed Circuit Board	Screw (2.6×10)(D)×2

HOW TO REPLACE FLAT PACKAGE IC

■ PREPARATION

SOLDER - - - - - Sparkle Solder 115A-1, 115B-1
OR
Almit Solder KR-19, KR-19RMA

· Soldering iron – – – – Recommended power consumption will be between 30 W to 40 W. Temperature of Copper Rod 662 \pm 50 °F (350 \pm 10°C)

(An expert may handle 60~80 W iron, but beginner might damage foil by overheating.)

· Flux - - - - - - HI115 Specific gravity 0.863

(Original flux should be replaced daily.)

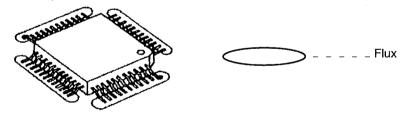
■ PROCEDURE

1. Temporarily fix FLAT PACKAGE IC by soldering on two marked pins.

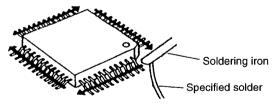


^{*}Accurate setting of IC to the corresponding soldering foil is vital.

2. Apply flux to all pins of FLAT PACKAGE IC.

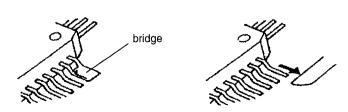


3. Solder using the specified solder by sliding the soldering iron in the direction of the arrow.



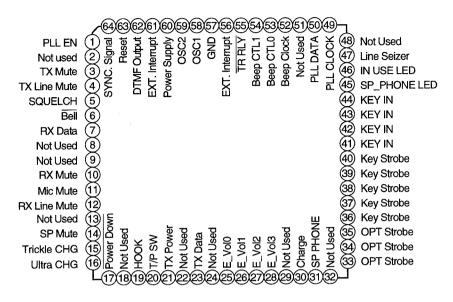
■ MODIFICATION PROCEDURE OF BRIDGE

- 1. Re-solder slightly on bridged portion.
- 2. Remove any remaining solder along pins using soldering iron as shown below.



CPU DATA (BASE UNIT)

IC501: MN150832KK



Pin No.	Description	I/O	High	High-Z	Low	Pin No.	Description	I/O	High	High-Z	Low
1	PLL EN	0	Active		Normal	29	Not Used	ı	-	-	Normal
2	Not Used	0	-	-	Normal	30	Charge	1	Normal	-	Charge
3	TX Mute	0	Mute	-	Unmute	31	SP PHONE	0	-	Normal	Active
4	TX Line Mute	0	Mute	-	Unmute	32	Not Used	0	-		Normal
5	SQUELCH	ı	Weak Electric Field	-	Strong Electric Field			0	-	Normal	Active
6	BELL	1	Normal	-	Bell	36~40	Key Strobe	0	-	Active	Normal
7	RX Data	1	Hi	-	Lo	41~44	KEY IN	ı	OFF	-	ON
8,9	Not Used	0	-	<u>-</u>	Normal	45	SP_PHONE LED	0	-	OFF	ON
10	RX Mute	0	Mute	-	Unmute	46	IN USE LED	0	-	OFF	ON-
11	Mic Mute	0	Mute	-	Unmute	47	Line Seizer	0	-	OFF	ON
12	RX Line Mute	0	Mute	-	Unmute	48	Not Used	0	-	-	Normal
13	Not Used	0	-	-	Normal	49	PLL CLOCK	0	Active	Normal	Active
14	SP Mute	0	Mute	-	Unmute	50	PLL DATA	0	Active	Normal	Active
15	Trickle CHG	0	Ultra: Lo Nor	mal: Hi	Trickle: Lo	51	Not Used	1	-	-	Normal
16	Ultra CHG	0	Hi	Lo	Lo_	52	Beep Clock	0	Active	Normal	Active
17	Power Down	1	Normal	-	Power Down	53	Beep CTL0	0	-	Hi:Hi Hi:Lo	
18	Not Used	0	-	-	Normal	54	Beep CTL1	0	-	Hi Lo	Hi
19	ноок	1	Hook	-	Normal	55	TR RLY	0	-	OFF	ON
20	T/P SW	1	Tone	-	Pulse	56	Ext. Interrupt	1	Normal	-	-
21	TX Power	0	ON	-	OFF	57	GND		-	-	Normal
22	Not Used	0	_	-	Normal	58	OSC1		Active	-	Active
23	TX Data	0	Hi	-	Lo	59	OSC2	0	Active	-	Active
24	Not Used	0	-	-	Normal	60	Power Supply		Normal	-	-
25	E_Vol0	0	-	Lo: Mir	n ~ Hi: Max	61	Ext. Interrupt	1	Normal	-	-
26	E_Vol1	0	-	Hi	Hi	62	DTMF Output	0	Active	Normal	Active
27	E_Vol2	0	-	Lo	Hi	63	Reset	1	Normal	-	Reset
28	E_Vol3	0	-	Lo	Hi	64	SYNC. Signal	0	Active	_	Active

Pin

No.

I/O

0

0

0

0

0

0

0

١

1

0

0

0

1

١

١

١

ı

0

0

High

Normal

Normal

Normal

OFF

OFF

OFF

OFF

Normal

(Data)

OFF

Description

Option Strobe 1

Option Strobe 0

3 Key Strobe 4

4 Key Strobe 3

5 Key Strobe 2

6 Key Strobe 1

7 Key Strobe 0

8 Key In 3

9 Key In 2

10 Key In 1

11 Key In 0

12 Not Used

13 Not Used

15 LED (TARK)

18 Sub Clock

21 Main Clock

22 (3.99MHz)

23 TX Data

24 TX Power

17 GND

20 Reset

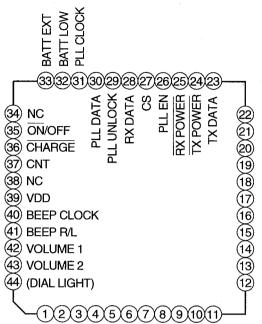
19

14 LED (BATT LOW)

16 LED (INTERCOM)

(32.768kHz)

CPU DATA (HANDSET)

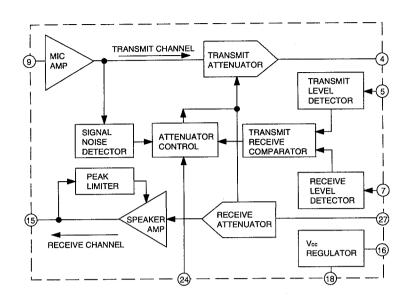


Pin I/O High-Z Low Description High High-Z Low No. 25 RX Power O Active **OFF** ON 0 26 PLL En Active Latch Normal Active 27 Squelch 1 Electric Field Low Electric Field High Normal Active 28 RX Data ı (Data) Normal Normal Active 29 PLL Unlock Unlock Lock 0 Normal Active 30 PLL Data (Data) Normal Normal Active 31 PLL Clock 0 (Clock) Normal Batt Low ON 32 ŀ High Low ON 1 33 Battery High Low ON 34 Not Used ON 35 ON/OFF I OFF ON Charge (Battery Terminal) Normal Charge 37 Charge (Control) Base Unit Charger **OFF** ON 38 Internally Conn. OFF ON VDD 39 **OFF** ON 40 Beep Clock 0 Normal (Clock) O Beep Control Low High VOLUME1 0 Lo:High High:Low 0 VOLUME2 :High High Reset 44 Dial Light O ON OFF Norami ON

IC202: PQVI0008GE98

EXPLANATION OF IC TERMINALS (BASE UNIT)

IC601: PQVISC77655S

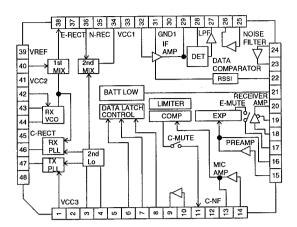


• Pin Description

Pin No.	Name	Description					
1	RR	A resistor to ground provides a reference current for the transmit and receive attenuators.					
2	RTX	A resistor to ground determines the nominal gain of the transmit attenuator. The transmit channel gain is					
		inversely proportional to the RTX resistance.					
3	TXI	Input to the transmit attenuator. Input resistance is nominally 5.0 kohms.					
4	TXO	Output of the transmit attenuator. The TXO output signal drives the input of the transmit level detector, as					
		well as the external circuit which drives the telephone line.					
5	TLI	Input of the transmit level detector. An external resistor ac coupled to the TLI pin sets the detection level.					
		Decreasing this resistor increases the sensitivity to transmit channel signals.					
6	TLO	Output of the transmit level detector. The external resistor and capacitor set the time the comparator will					
		hold the system in the transmit mode after speech ceases.					
7	RLI	Input of the receive level detector. An external resistor ac coupled to the RLI pin sets the detection level.					
		Decreasing this resistor increases the sensitivity to receive channel signals.					
8	RLO	Output of the receive level detector. The external resistor and capacitor set the time the comparator will					
		hold the system in the receive mode after the receive signal ceases.					
9	MCI	Microphone amplifier input. Input impedance is nominally 10 kohms and the dc bias voltage is					
		approximately equal to VB.					
10	мсо	Microphone amplifier output. The mic amp gain is internally set at 34 dB (50 V/V).					
11	CP1	A parallel resistor and capacitor connected between this pin and Vcc holds a voltage corresponding to the					
		background noise level. The transmit detector compares the CP1 voltage with the speech signal from CP2.					
13	CP2	A capacitor at this pin peak detects the speech signals for comparison with the background noise level held					
		at CP1.					

Pin No.	Name	Description				
13	XDI	Input to the transmit detector system. The microphone amplifier output is ac coupled to the XDI pin through				
		an external resistor.				
14	SKG	High current ground pin for the speaker amp output stage. The SKG voltage should be within 10 mV of the				
		ground voltage at Pin 22.				
15	SKO	Speaker amplifier output. The SKO pin will source and sink up to 100 mA when ac coupled to the speaker.				
		The speaker amp gain is internally set at 34 dB (50 V/V).				
16	V+	Input dc supply voltage. V+ can be powered from Tip and Ring if an ac decoupling inductor is used to				
		prevent loading ac line signals. The required V+ voltage is 6.0 to 11V (7.5V nominal) at 7.0 mA.				
17	AGC	A capacitor from this pin to VB stabilizes the speaker amp gain control loop, and additionally controls the				
		attack and decay time of this circuit. The gain control loop limits the speaker amp input to prevent clipping				
		at SKO. The internal resistance at the AGC pin is nominally 110 kohms.				
18	CS	Digital chip select input. When at a Logic "0" (<0.7V) the Vcc regulator is enabled. When at a Logic "1"				
		(>1.6V), the chip is in the standby mode drawing 0.5mA. An open $\overline{\text{CS}}$ pin is a Logic "0". Input impedance is				
		nominally 140 kohms. The input voltage should not exceed 11 V.				
19	SKI	Input to the speaker amplifier. Input impedance is nominally 20 kohms.				
20	Vcc	A 5.4 V regulated output which powers all circuits except the speaker amplifier output stage. Vcc can be				
		used to power external circuitry such as a microprocessor (3.0 mA max). A filter capacitor is required.				
		The PQVISC77655 can be powered by a separate regulated supply by connecting V+ and Vcc to a voltage				
		between 4.5 V and 6.5 V while maintaining CS at a Logic "1".				
21	VB	An output voltage equal to approximately Vcc/2 which serves as an analog ground for the speakerphone				
		system. Up to 1.5 mA of external load current may be sourced from VB. Output impedance is 250 ohms.				
		A filter capacitor is required.				
22	Gnd	Ground pin for the IC (except the speaker amplifier).				
23	XDC	Transmit detector output. A resistor and capacitor at this pin hold the system in the transmit mode during				
		pauses between words or phrases. When the XDC pin voltage decays to ground, the attenuators switch				
		from the transmit mode to the idle mode. The internal resistor at XDC is nominally 2.6 kohms.				
24	VLC	Volume control input. Connecting this pin to the slider of a variable resistor provides receive mode volume				
		control. The VLC pin voltage should be less than or equal to VB.				
25	ACF	Attenuator control filter. A capacitor connected to this pin reduces noise transients as the attenuator				
		control switches levels of attenuation.				
26	RXO	Output of the receive attenuator. Normally this pin is ac coupled to the input of the speaker amplifier.				
27	RXI	Input of the receive attenuator. Input resistance is nominally 5.0 kohms.				
28	RRX	A resistor to ground determines the nominal gain of the receive attenuator. The receive channel gain is				
		directly proportional to the RRX resistance.				

EXPLANATION OF IC TERMINALS



Base Unit

IC201.: PQVIT31224AH

Handset

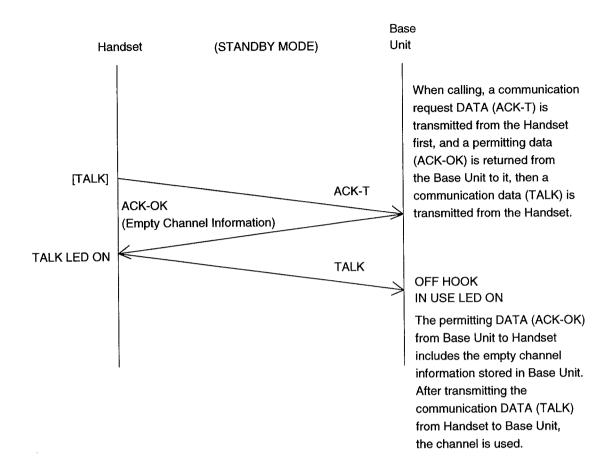
IC1.: PQVIT31224AR

Pin No.	Name	Description					
1	TX-IN	Input terminal of TX-VCO					
2	VCC3	Power supply terminal	Power supply terminal				
3	LO-1	Local oscillator input output terminal					
4	LO-2	Colpitts oscillating circuit consists of internal e Additionally external injection through pin 3 is	Colpitts oscillating circuit consists of internal emitter follower circuit and external crystal. Additionally external injection through pin(3)is available.				
5	SIG OUT	Detection signal output terminal, which is an or	oen drain.				
6	CLK	Clock input terminal					
7	DATA	Serial data input terminal	Input the serial data to control this IC.				
8	STB	Strobe signal input terminal					
9	FIL-OUT	Filter amplifier output terminal					
10	FIL-IN	Filter amplifier input terminal					
11	COMP-OUT	Compressor output					
12	C-NF	SUM amplifier T-shape feed-back circuit consists of external compressor.					
13	MIC-OUT	Mic amplifier output, which is connected to SUM amplifier input directly.					
14	MIC-IN	Mic amplifier input terminal					
15	PRE-IN	Preamplifier inverting input terminal					
16	PRE-OUT	Preamplifier output terminal, which is connected to expander directly.					
17	EXP-OUT	Expander SUM amplifier output terminal, where the signal from gain cell is amplified as inverting amplifier.					
18	RECE-IN	Receiver amplifier inverting input terminal					
19	RO1	Receiving output terminal for dynamic received	r				
20	RO2	Outputs from RO1 and RO2 (BTL type) when ceramic receiver is using.					
21	BAT-ALM	Battery alarm terminal goes high when power supply voltage VCC becomes VBAT-L or less. Data bit controls the detection voltage. This terminal is an open collector output.					
22	RSSI	DC voltage is output according to the input signal level of IF amplifier. The dynamic range is approximately 70dB.					
23	DATA-OUT	Wave arrangement output terminal. This terminal is an open collector output.					
24	D-COMP-IN	Data comparator input terminal to which demodulated signal of data is input.					

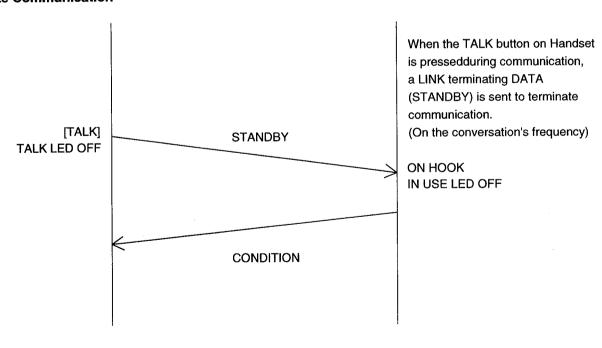
Pin No.	Name	Description
25	N FIL-IN	Noise filter input output terminal. BPF consists of external condenser and resistor. This terminal is connected to the rectifier circuit through inside coupling condenser.
26	N FIL-OUT	
27	AF-OUT	Demodulation output signal terminal. Carrier leak is decreased by built-in LPF. Output impedance is approximately 360Ω .
28	QUAD	Phase input terminal of FM demodulator
29	IF-OUT	IF output terminal
30	GND1	GND terminal
31	DEC	2nd IF input terminal and decoupling terminal for bias. Input impedance of Pin 32 is approximately $1.5 k\Omega$.
32	IF-IN	
33	Vcc1	Power supply terminal
34	2nd MIX-OUT	Mixer output terminal. Output impedance is approximately $1.5k\Omega$.
35	N-REC	The noise filter output is filtered through external capacitor after amplified about 20dB
36	2nd MIX-IN	1st IF input terminal. Input impedance is approximately 4.7kΩ (at 10.695MHz).
37	E-RECT	Connects to the capacitor for rectification in full-wave rectifier circuit of expander.
38	1st MIX-OUT	Mixer output terminal which is connected to the external filter. Output impedance is approximately 330Ω (standard).
39	V REF	Reference voltage of compander which is passed through inside buffer.
40	1st MIX-IN	Mixer input terminal. The mixer is applied the double balanced mixer method.
41	VCC2	Regulator terminal, which outputs 2.0V.
42	VCO-CONT	RX-VCO voltage control terminal
43	VCO-1	RX-VCO resonant terminal
44	VCO-2	
45	C-RECT	Rectifier terminal of compressor. The circuit configuration is the same with E-RECT terminal.
46	RX-OUT	Charge pump output terminal. Constant current output type is adopted and output current can be changed according to the input data.
47	TX-OUT	
48	GND2	GND terminal

EXPLANATION OF CPU DATA COMMUNICATION

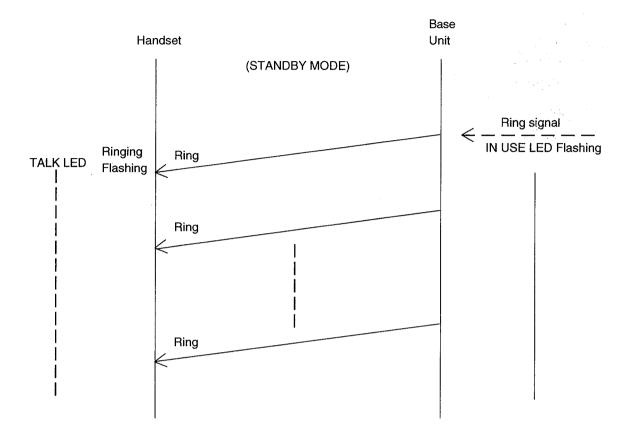
1. Calling



2. To terminate Communication



3. Ringing



After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring) on the base's TX frequency, then the Handset starts ringing.

4. Ports for transmitting and receiving of data

Handset:

transmitting ... 23 Pin

receiving ... 28 Pin

Base Unit:

transmitting ... 23 Pin

receiving ... 7 Pin

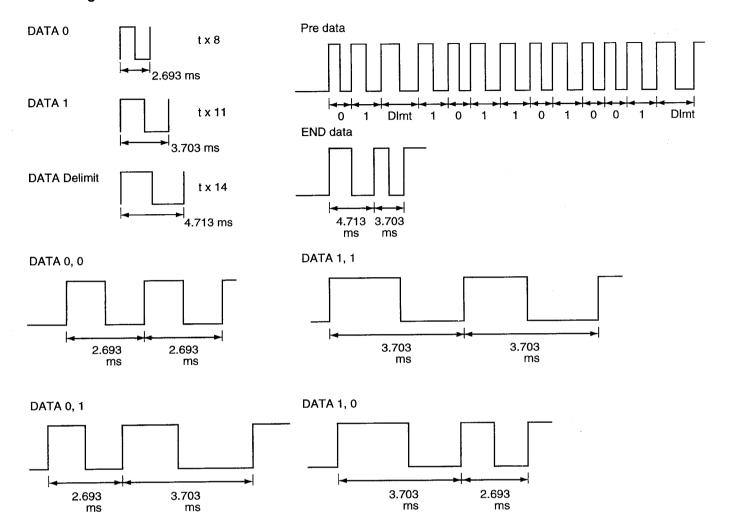
5. Waveform of DATA used for cordless transmission and reception

The DATA which is transmitted from the Handset to the Base Unit is combination of DATA 0, DATA 1, DATA Delimit, Pre data and End data.

The DATA which is transmitted from the Base Unit to the Handset is combination of DATA 0, DATA 1, DATA Delimit, Pre data and End data.

HANDSET

Transmitting DATA Format



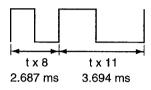
BASE UNIT

Transmitting DATA Format

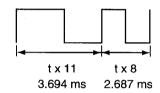
DATA 00



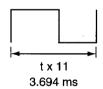
DATA 01



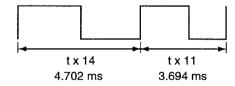
DATA 10



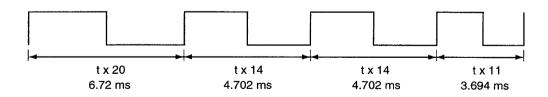
DATA 11



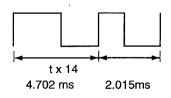
DATA Delimit



Pre data



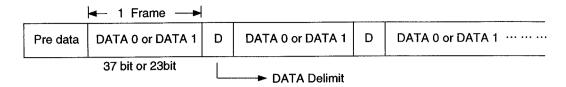
END data



Mute data (9bit)

0, 1, D, 1, 0, 1, 1, 0, 1, 0, 0, 1, D • • • 45 ms

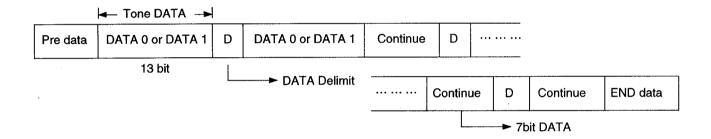
6. When LINKing



When LINKing from the Handset (changing from STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA (37bit) format first. Then, when LINK OK (ACK-OK) DATA (23bit) is returned from the Base Unit, it is sent as LINK form DATA after changing the combination of DATA 0 and DATA 1. And the DATA Delimt is between each Frame as a stop.

The contents of LINK requesting DATA and LINK form DATA are different depending on each operation.

7. Tone Dial



When executing Tone Dial, Tone Dial DATA is transmitted from the Handset to the Base Unit in above format. The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialling, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the TONE Dial exterminating DATA (Tone end DATA) is send, and the END data is sent finally.

NOTE

65,000 kinds of the security code are available for the model KX-TC187AL-W. Each time the handset is set on the cradle of the base unit (for charging), the CPU automatically changes the security code.

ADJUSTMENTS (BASE UNIT)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy
The base unit does not respond to a call from handset.	Make adjustments in item (A)
The base unit does not transmit or the transmit frequency is off.	Make adjustments in item (B)
The transmit frequency is off.	Perform test in item (C)
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Make adjustments in item (D)
The reception sensitivity of base unit is low with noise.	Make adjustments in item (E)
The transmit level is high or low.	Make adjustments in item (F), (G)
The reception level is high or low.	Make adjustments in item (H)
The unit does not link.	Perform test in item (I)

Unit condition:

Remove the antenna from P.C. Board of the base unit. Line current 80mA.

How to set the test mode:

- 1. Set the ringer switch to "HIGH".
- 2. In pressing S1, set S2 to ON (Power supply is turned ON).
- 3. The state of the unit changes as following when "VOLUME UP" switch is pressed.

	Test Mode	RX Freq.	TX Freq.	Mode
Power supply is turned ON	Test Mode (1)	CH10	CH10	Talk
Press "VOLUME UP" switch 1 time	Test Mode (2)	СНА	CHA	Talk
Press "VOLUME UP" switch 1 time	Test Mode (3)	СНВ	СНВ	Talk
Press "VOLUME UP" switch 1 time	Test Mode (4)	СНС	CH1	Talk
Press "VOLUME UP" switch 1 time	Test Mode (5)	CH1	СНВ	Intercom
Press "VOLUME UP" switch 1 time	Test Mode (6)	CH1	СНВ	Locator

When replacing these parts, adjust as shown in table below table.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
IC201, T203	(A) RX VCO Adjustment	Test Mode (1)	T203	 Set S3 to RX side. Adjust T203 so that the reading of the Digital Voltmeter is 3.5 V±0.1 V.
D301 , T351	(B) TX VCO Adjustment	Test Mode (1)	T301	 Set S3 to TX side. Adjust T301 so that the reading of the Digital Voltmeter is 1.7 V±0.1 V.
DUP301, X201 T202	(C) TX Frequency Confirmation	Test Mode (3)		1. Set S4 to ON. 2. Comfirm so that the reading of the frequency counter is 30.350 kHz±0.5 kHz.
VR302, Q302	(D) TX Power Adjustment	Test Mode (2)	T351	 Set S5 to ON. Adjust VR302 so that the reading of the RF VTVM is ≥650mV.

When replacing these parts, adjust as shown in table below.

▼ Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
T201	(E) RX Sensitivity Adjustment	Test Mode (2)	T201	 Set S6, S7 to ON. Apply a 60dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 0 kHz). Adjust T201 so that the reading of the RF VTVM is maximum output (10~50 mV).
T202	(F) Line Output Maximum Adjustment	Test Mode (3)	T202	 Set S6, S8 to ON. Apply a 40dB μ Vemf output from S.S.G. (modalation frequency 1 kHz. dev. 0 kHz), and adjust T202 so that reading of the AF VTVM is 0.9 V±0.05V.
VR201	(G) Line Output Level Adjustment	Test Mode (3)	VR201	 Set S6, S8 to ON. Apply a 40dB μ Vemf output from S.S.G (modalation frequency 1kHz. dev. 3kHz). Adjust VR201 so that the reading of the AF VTVM is 0 dBm±0.5 dBm (600 Ω load).
VR301	(I) Line Input Modulation Adjustment	Test Mode (3)	VR301	 Set S6, S9 and S10 to ON. Input via loop simulator 1.0 kHz, -20.0 dBm/600 Ω signal. Apply a 40 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 0 kHz). Adjust VR301 so that the reading of the FM Deviation Meter is 3.0 kHz±0.1 kHz.
IC201	(J) Carrier Sensitivity Comfirmation	Test Mode (4)		 Set S6, S11 to ON. Apply a 35 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 3 kHz). Comfirm so that the oscilloscope becomes Low. Apply a 15 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 3 kHz). Comfirm so that the oscilloscope becomes High.

The connection of adjustment equipments are as shown in page 26.

FOR SCHEMATIC DIAGRAM (BASE UNIT) [page 27]

- 1. S1: Dialling Mode Selector Switch.
- 2. S2: Ringer Selector Switch.
- 3. S11: Volume (down) Switch.
- 4. S12: Volume (Up) Switch.
- 5. S15: Redial / Pause Switch.
- 6. S16~24,26,27: Dialling Switch.
- 7. S25: Tone Switch.
- 8. S28: Recall Switch.
- 9. S29: Hold Switch.
- 10. S30: SP-Phone Switch.
- 11. S31: Locator / Intercom Switch.

12. DC voltage measurements are taken with electronic voltmeter from negative voltage line.

This schematic diagram may be modified at any time with development of new technology.

Important Safety Notice:

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.

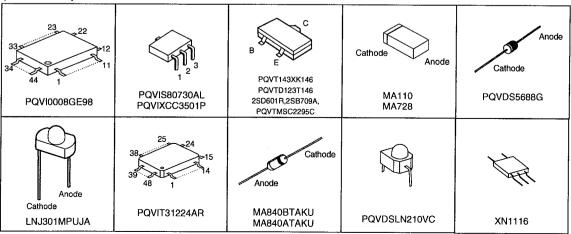
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

(BASE UNIT)

(BAGE GITT)		·		
8 5 1 4 AN6183SAE1	25 38 39 48 1 PQVIT31224AH	33 48 48 48 49 64 1 MN150832KK	15 14 PQVISC77655S	E C B 2SA1625 PQVTKSD261CY
PQVTMSC2295C 2SC2412K 2SD1819A 2SB709A, 2SB1218A PQVTFB1A4M	2SD2137	2SD1994A 2SD1991A	2SK543	PQVDS1ZB40F1
Cathode Anode PQVDKV1832C3	Anode Cathode MA4100, MA4062 MA4047, MA4150 MA4043	Anode Cathode 1SS119 MA161	Anode Cathode MA700A MA4330M	Cathode Anode MA110
Cathode Anode PQVDPY1112H PQVDBR1112H	BC E 2SC1740S			

(HANDSET)



■ For SCHEMATIC DIAGRAM (HANDSET) [Page 31]

1. SW1~10, 12: Dialling Switch

2. SW11: Tone Switch

3. SW13: Program Switch

4. SW14: Recall Switch

5. SW15: Auto Switch

6. SW16: Redial Switch

7. SW17: Channel Switch

8. SW18: Intercom Switch

9. SW19: Talk Switch

10. SW20: Ringer Switch

11. SW21: Pause Switch

12. DC voltage measurements are taken with electronic voltmeter from negative voltage line. (Talk Posittion)

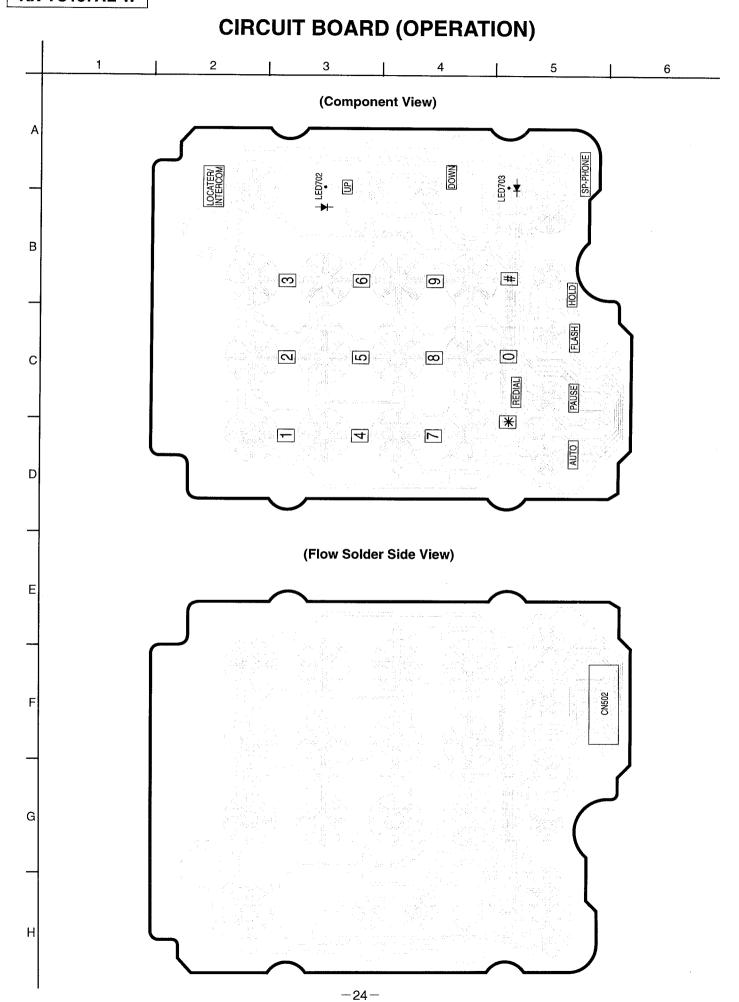
This schematic diagram may be modified at any time with the development of new technology.

FREQUENCY TABLE (MHz)

	BASE UNIT		HANDSET	
СН	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Frequency
1	30.075	39.775	39.775	30.075
2 .	30.125	39.825	39.825	30.125
3	30.175	39.875	39.875	30.175
4	30.225	39.925	39.925	30.225
5	30.275	39.975	39.975	30.275
6	30.100	39.800	39.800	30.100
7	30.150	39.850	39.850	30.150
8	30.200	39.900	39.900	30.200
9	30.250	39.950	39.950	30.250
10	30.300	40.000	40.000	30.300

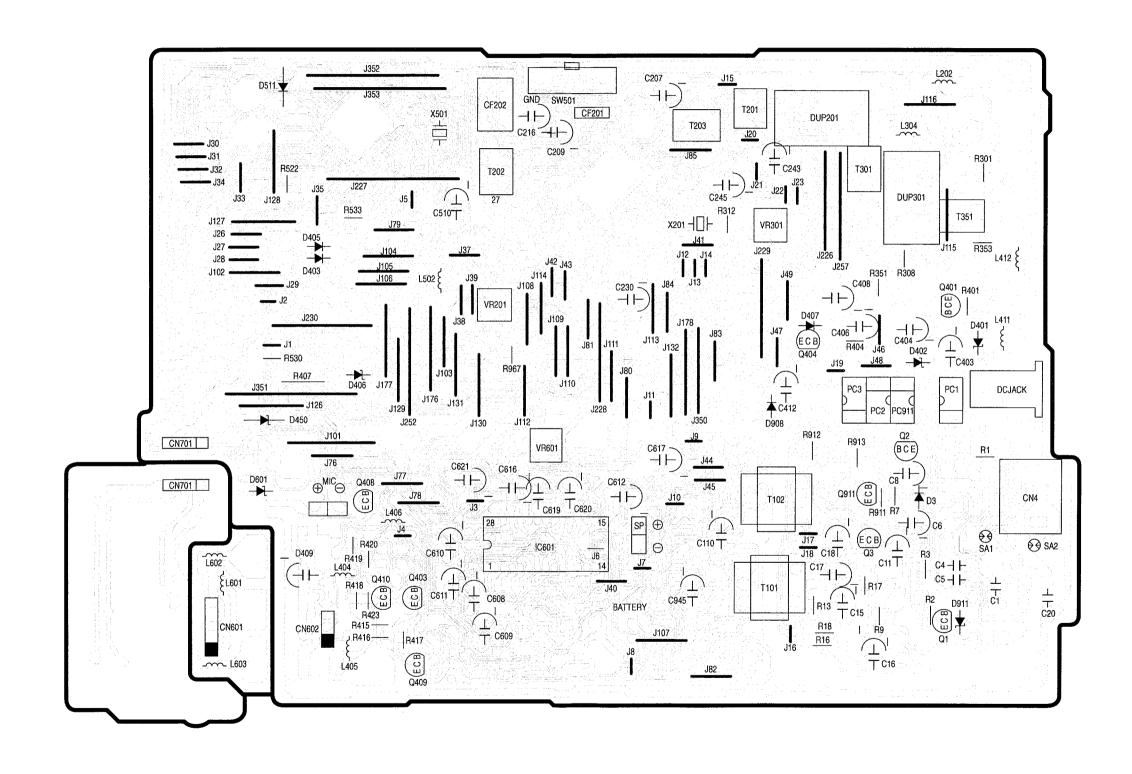
TEST MODE

	BASE UNIT		HANDSET		
СН	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Frequency	
А	30.050 MHz	39.7375 MHz	40.050 MHz	30.375 MHz	
В	30.350 MHz	40.025 MHz		30.020 MHz	
С		39.7125 MHz	39.700 MHz	30.000 MHz	
E			39.675 MHz	29.975 MHz	



CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (BASE UNIT)

(Component View)



CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (BASE UNIT) 6 11 12 (Flow Solder Side View) Rx Sense (455KHz) Tx Power Tx / Ax Vco Det Out Modulation Freguency Counter RF V.V. S.S.G. D.M.M D.M.M. RF V.V. 42 Pin 50 (35) Pir Tx GND R513 R512 • R514 •R519 D250 • R202 • R203 • R293 • 🕽 ∕• C281 R532 C504 • C212 C208 C291 • R311 • C316 •C201 • C248 • C251 C215 C211 •C505 C508 • C210 • R205 J31 ₹ • •J309 C303 R370 • • •C507 R232 / C R231 / C R235 •C203 C218 C214 R536 R206 R206 R209 R207 C219 R209 R207 C217 R211 P211 P212 R208 C217 C311 J302 •R516[•]R511 S3 • D301 J301 • B229

C306 R234 R305

C306 C306 C3107 R305

C307 C308 B C314

C308 C308 C310

C308 R308 C313

CC C R308 C313

CC C R308 R308

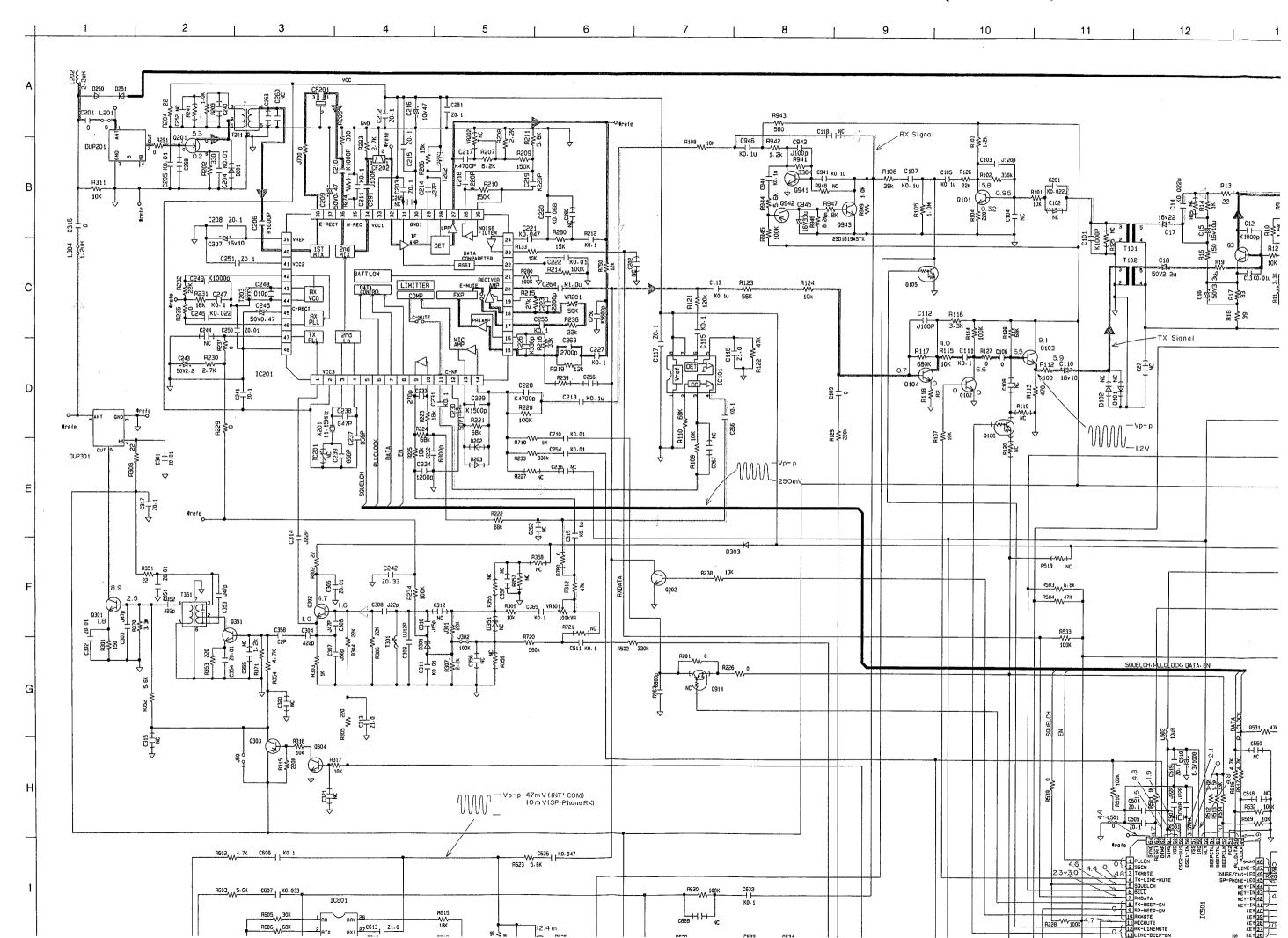
R308 R309 E B R303

R371 R352 • • •R504 R505 C250* •C551 C302 • • C352 •C519 C365 * C238 • C239 • C353 • R539 • R224 ...
R225 • C232 • C263 • C264 • R220 • C254 • R220 • C254 • C7 C319 • H302 | E B R303 C307 C D303 R317 •J318 0,0 R110 IC101 C116 • R121 • R122 • C113 R109 • R108 R402 • Q402 R515 • D508 • **‡** /C\ R316∙ R406 • \C/ R406 • C/ R408 • C776 • A Q406 EBC407 D404 C/ • R411 R421 • R421 C R315 •C317 S2 DC⊕ •C413 C503 • R409 • B E Q405 R593 B E •J325 R503 • • R531 R634 • R611 • C R414 C515 B E C605 • G601 R629 • C633 • R1000 • C514 63V 470 F S 10 ⊖⊕ R617 • C618 • R604 • •R613 C615 • C614 R616 R612 • Q102 E B DC Feed •R107 ₽ ⊕⊕ Q103 C106 R113 E B R116 C111 R113 C946 R117 R128 R942 C946 R117 R128 C112 R115 R615 • R112 • DC 48V C606 • R602 • C613 • J313 C409 • R945_R943_C944 C10 • R10 H945 FB +8945 C944 C Q104 R Q942 FB +8944 C Q104 R FR106 FB947 C FR124 FB B FR103 C C107 B E Q943 J321 C C FR104 FB949 C105 FB C942 C105 FB C942 C105 FB C942 FR101 C FR941 J322 O.S.C. C14• R14• D1 R620 • Q602 E B J306 C410 • •J322 •C411 Noise squech S 11 Oscillo Scope -26-

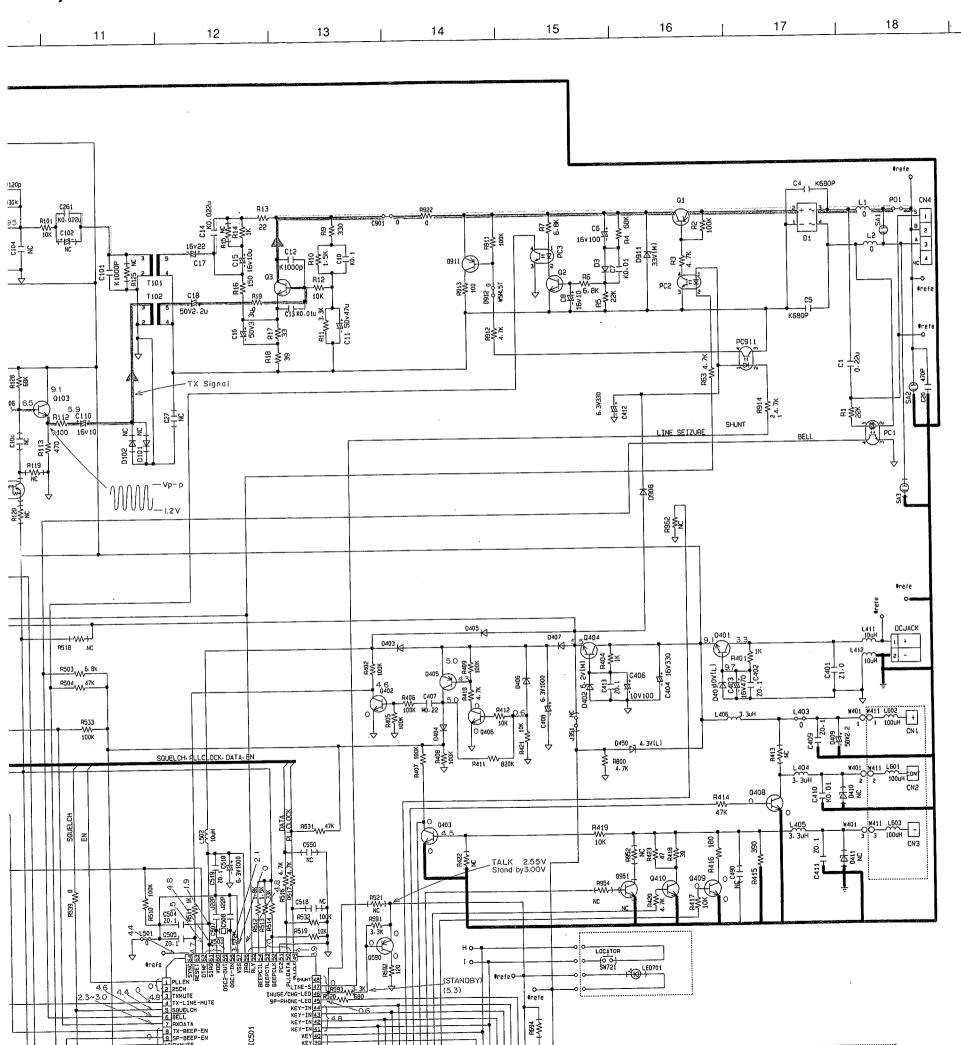
KX-TC187AL-W

KX-TC187AL-W

SCHEMATIC DIAGRAM (BASE UNIT)

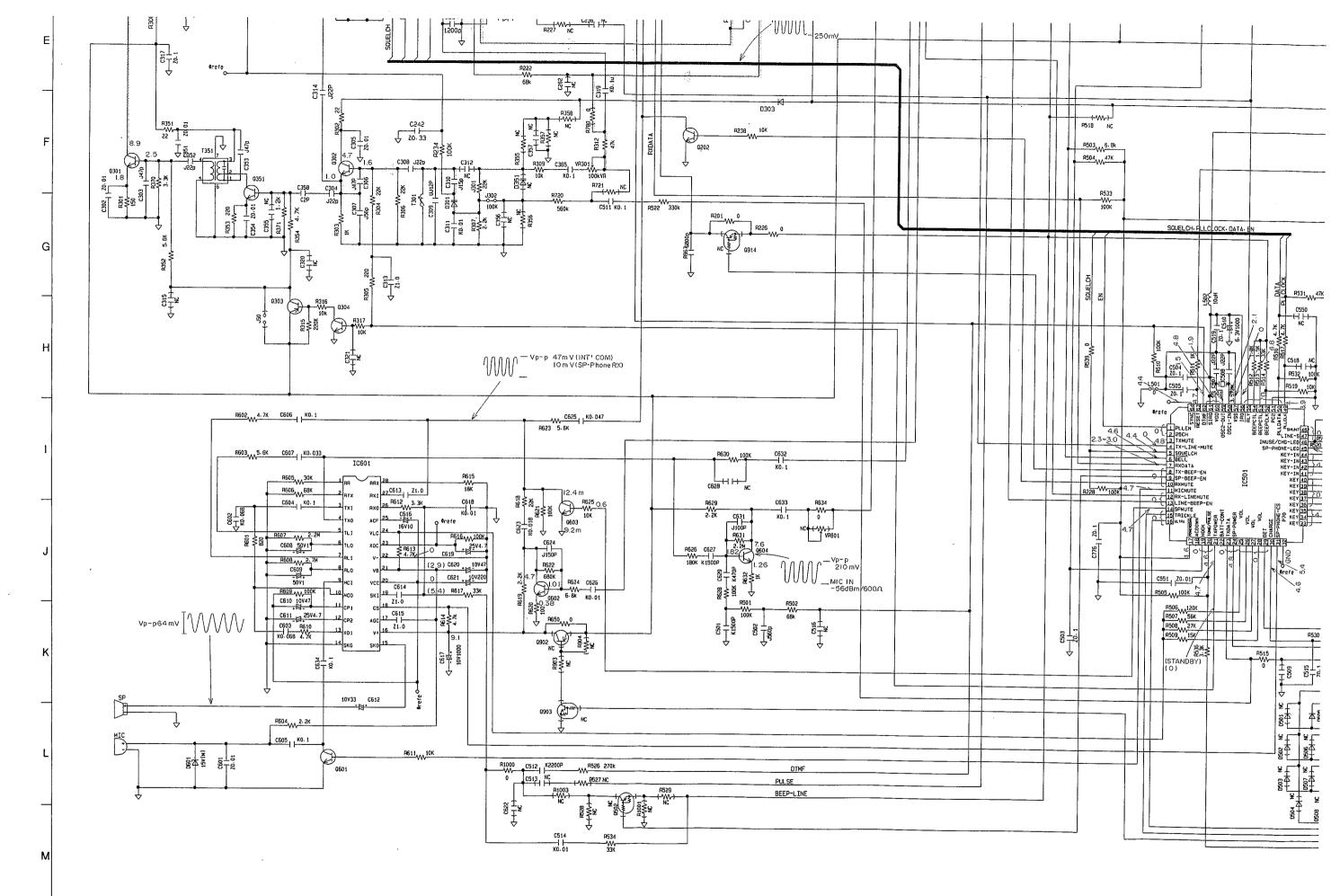


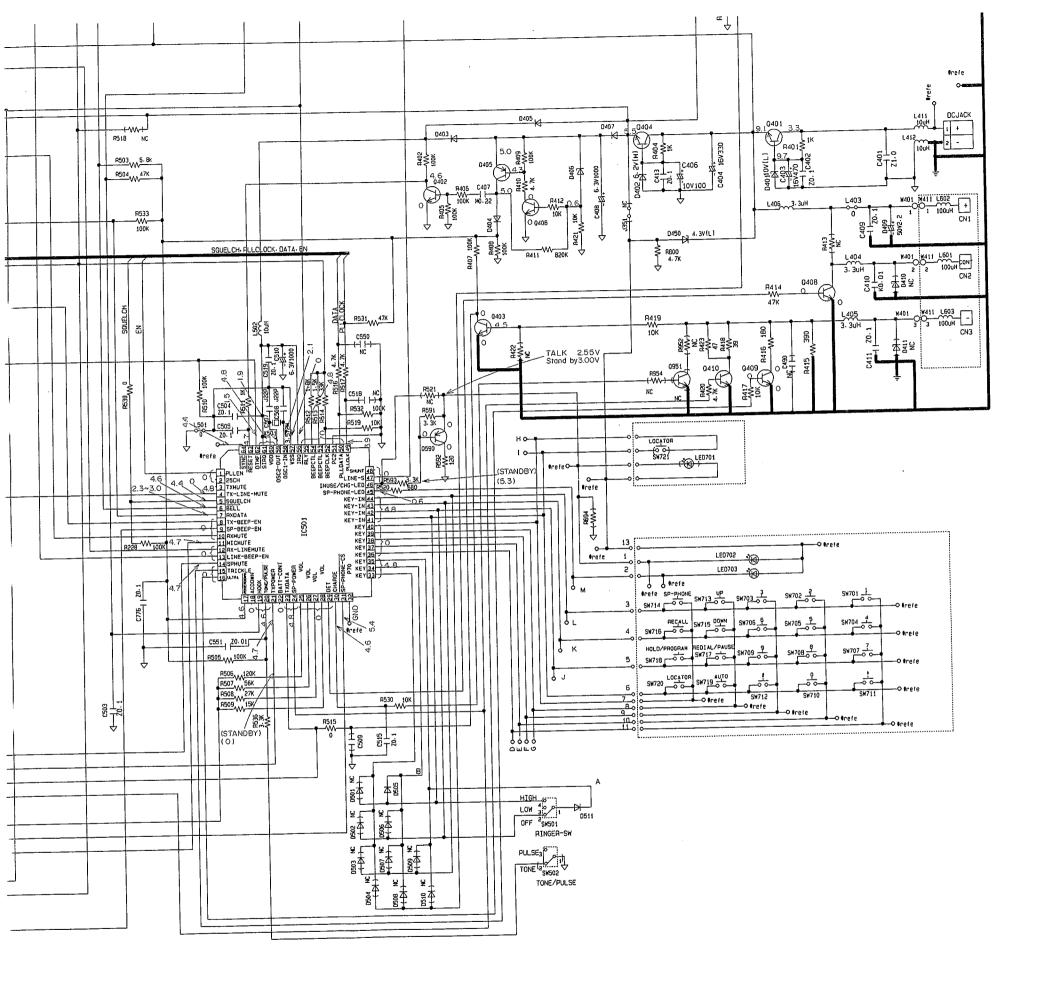
UNIT)

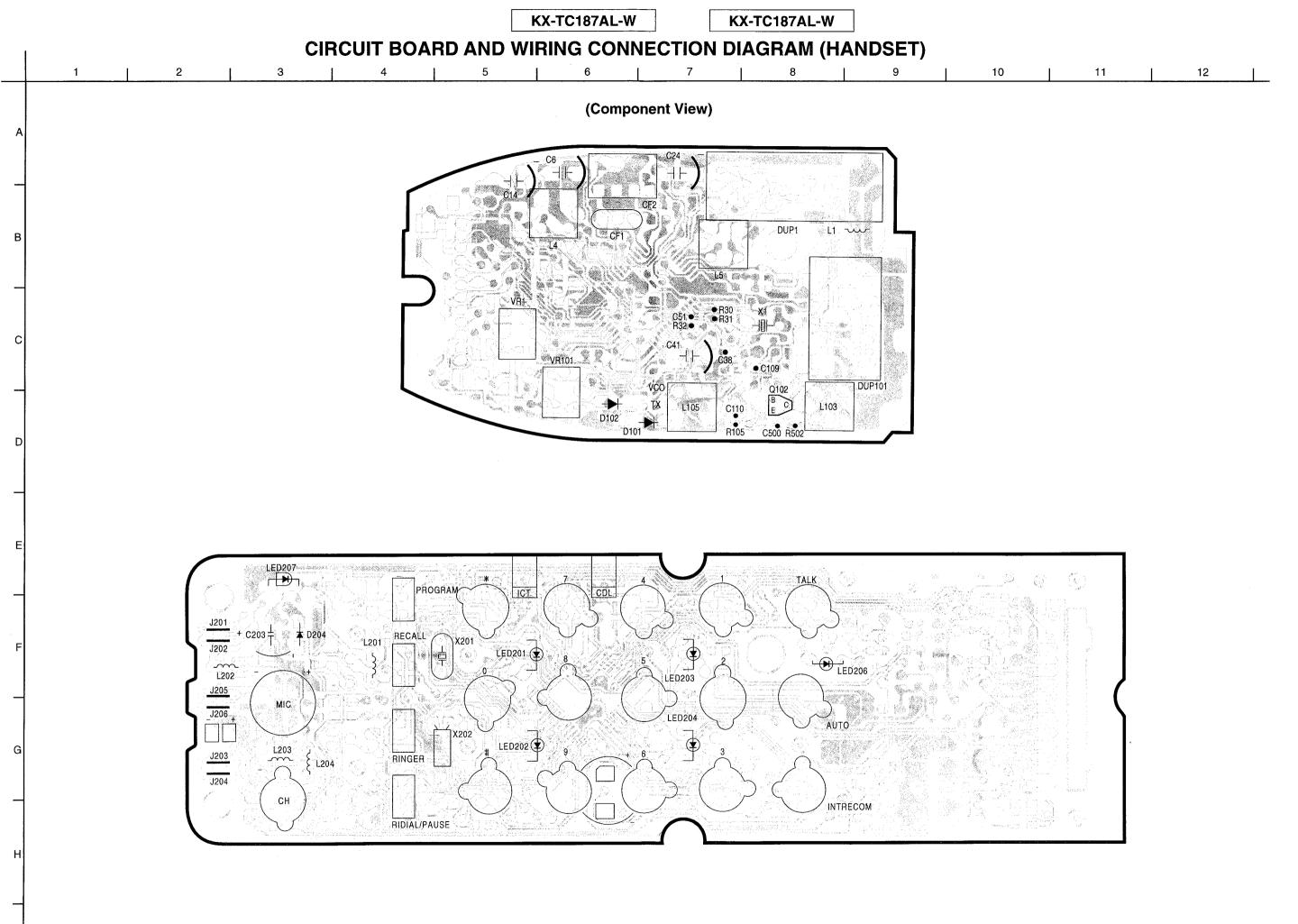


KX-TC187AL-W

τij







KX-TC187AL-W

KX-TC187AL-W KX-TC187AL-W **SCHEMATIC DIAGRAM (HANDSET)** 10 11 12 RX Signal \mathcal{N} 260mV ~SPKE T IC203 3.9 ãŞg (~19.4dBm) SPECTRUM ANALYZER BATTLOW W5NL5T J202 LIMITTER CONTROL OPTION DIODE C25 -121+ 2. 2u IC201 C-HUTE D209 TEST HODE W5NL5T J204 C19 K0-1 TEST MODE CH W5NL5T 3.7 IC204 0211 _{0PT} 810 27 8 Ø GND A RXPOW TXINT PLLDATA CLOCK TXPOW DECTOUT EXIN EXIN 11 C225 K820p \$\frac{1}{2} \frac{1}{2} \frac C114 K0.01 H109 D C116 Z0-1 R113 68K

ADJUSTMENTS (HANDSET)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy	
The setting of Battery Low Indicator is wrong.	Perform checks in item (A)	
The base unit does not respond to a call from handset.	Make adjustment in item (B)	
The base unit does not transmit or the transmit frequency is off.	Make adjustment in item (C)	
The transmit frequency is off.	Perform checks in item (D)	
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Perform checks in item (E)	
The reception sensitivity of base unit is low with noise.	Make adjustment in item (F)	
Does not link between base unit and handset.	Perform checks in item (G), (H)	
The reception level is high or low.	Make adjustment in item (I)	
The transmit level is high or low.	Make adjustment in item (J)	

Unit condition:

- 1. Remove the antenna lead wire from P.C. Board of handset.
- 2. Power Supply: DC 3.9V
- 3. Volume: HIGH (When P.C. Borad of handset is in test mode, volume condition is high.)

4. Speaker Load: 130 Ω

How to set the test mode. CH10 Test Mode

1. After connecting the diode D209,DA and apply a power supply DC 3.9 V. (The unit enters CH10 Talk)

3. Press the Talk Switch.

2. Press the talk switch.
(The unit enters CH10 standby)

 CH
 TX Frequency
 RX Frequency

 CH10
 40.000 MHz
 30.300 MHz

 CHA
 40.050 MHz
 30.375 MHz

 CHB
 30.020 MHz

4. Press the channel switch,

CH10 → CH1 → CH2.....CH9

5. Press the "AUTO" switch,

CH10 → CHA → CH1 → CH1

	Test Mode	RX Freq.	TX Freq.	Mode
Power supply is turned ON	Test Mode (1)	CH10	CH10	Talk
Press "REDIAL" switch 1 time	Test Mode (2)	CHA	CHA	Talk
Press "REDIAL" switch 1 time	Test Mode (3)	СНВ	CH1	Talk
Press "REDIAL" switch 1 time	Test Mode (4)	CH1	CH1	Talk
Press "TALK" switch 1 time	Test Mode (5)	CH1	OFF	ST-BY

KX-TC187AL-W

When replacing these parts, adjust as shown in table below.

	When replacing these pa	arts, adjust a	s snown in tai	DIE DEIOW.
√ Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
IC204	(A) Battery Low Confirmation	CH10 Talk		 Set S1 to ON. Set the power supply voltage to DC 3.62 V, and confirm so that the reading of oscilloscope is High. Set the power voltage to DC 3.52 V, and confirm so that the reading of oscilloscope is Low.
IC1, X1, L105	(B) TX VCO Voltage Adjustment	CH10 Talk	L105	Set S2 to TX VCO side. Adjust L105 so that the reading of digital voltmeter is 2.3 V ±0.1 V (After adjusting, set S2 to OFF).
IC1, X1, L5	(C) RX VCO Voltage Adjustment	CH10 Talk (1)	L5	1. Set S2 to RX VCO side. 2. Adjust L5 so that the reading of digital voltmeter is 3.0 V±0.1 V (After adjusting, set S2 to OFF).
X1, IC1	(D) TX frequency Confirmation	CHA Talk (2)	_	1. Set S3 to ON. 2. Confirm that the reading of frequency counter is 40.050 MHz±500 Hz.
DUP101	(E) TX Power Confirmation	CHA Talk (2)		 Set S4 to ON (S3:OFF). Output level should be between ≥480 mV on RF VTVM (50 Ω load).
L4,DUP1	(F)RX Adjustment (Detector Output) (2nd IF Output)	CHA Taik (2)	L4	 Set S5 to ON (S3, S4, S8: OFF). Apply a 60 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 3kHz) Adjust L4 so that the reading of DC voltmeter 0.9 ±0.05 V Set S7 to ON. Apply a 60 dB μ Vemf output from S.S.G. (modulation frequency 1kHz, dev. 3 kHz) Comfirm 2nd IF output so that its reading of RF VTVM is maximum output (10~30 mV).
	(I) Noise Squelch Conformation	CHA Talk		 Procedure 1. + Press S1 twice to set CHB. Apply a 40 dB μ Vemf output from S.S.G. (modulation frequency 6.0kHz, dev. 12kHz). Oscilloscope switches High. Apply a 40 dB μ Vemf output from S.S.G. (modulation frequency 6.0 kHz, dev. 0 kHz). Oscilloscope switches Low.
	(G) Carrier Sensitivity Confirmation	CHB Talk		 Procedure 1. + Press S1 third times to set CHC. Apply a 30 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 3 kHz). Oscilloscope switches Low. Apply a 15 dB μ Vemf output from S.S.G. (modulation frequency 1 kHz, dev. 3 kHz). Oscilloscope switches High.
	(H) Data Moudulation Confirmation	CHA Talk		 Set S9 to ON. Keep pressing the flash button. Confirm for a 3.5~6.5 kHz FM Deviation Meter reading.
VR1	(I) Speaker Output Level Adjustment	CHA Talk	VR1	 Set S10, S6 to ON. Apply a 40 dB μ Vemf output from S.S.G.(modulation frequency 1kHz, dev. 3kHz). Adjust VR1 so that the reading of AF VTVM is – 28±0.5 dBm. (distortion: less than 6%) (volume: High)
VR101	(J) MIC Modulation Factor Adjustment	CHA Talk	VR101	 Set S9, S11 to ON. Apply a MIC signal (1kHz, – 40 dBm at 600 Ω load). Adjust VR 101 so that the reading of FM Deviation Meter is 2.5 kHz±0.1 kHz.

The connections of adjustment equipments are as shown in page 30.

RF SPECIFICATION

BASE UNIT

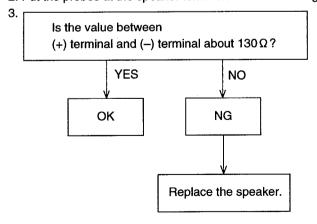
Item	Value	Refer to —.	Remarks
TX Frequency	30.350 MHz±500Hz	Page 20 (C)	
TX Power	≥ 650mV	Page 20 (D)	
TX Modulation factor	3.0±0.1kHz		
TX Modulation Distortion	Less than 7%		
Line Modulation factor (Max.)	4.0±0.1kHz		
Data Modulation factor	5±1.5kHz		

HANDSET

ltem	Value	Refer to —.	Remarks
Practical Sensitivity	Less than 5 dB μV		at CHA
Carrier Sensitivity	Into 15~30 dB μV	Page 32 (G)	Low → High at CHB
TX Frequency	40.050 MHz±500Hz	Page 32 (D)	at CHA
TX Output	Over 480 mV	Page 32 (E)	at CHA (Antenna soldering point 50Ω Load)
Data Modulation factor	3.5 kHz/dev~6.5 kHz/dev	Page 32 (H)	at CHA
MIC Modulation factor	2.5 kHz/dev~0.9 kHz/dev	Page 32 (J)	at CHA (MIC terminal -40dBm Input)

HOW TO CHECK THE HANDSET SPEAKER

- 1. Use a digitial voltmeter, and set the selector knob to ohm scale.
- 2. Put the probes at the speaker terminals as shown in Fig.7



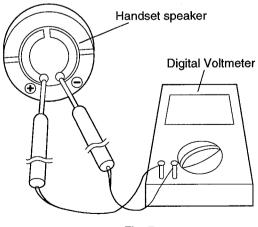
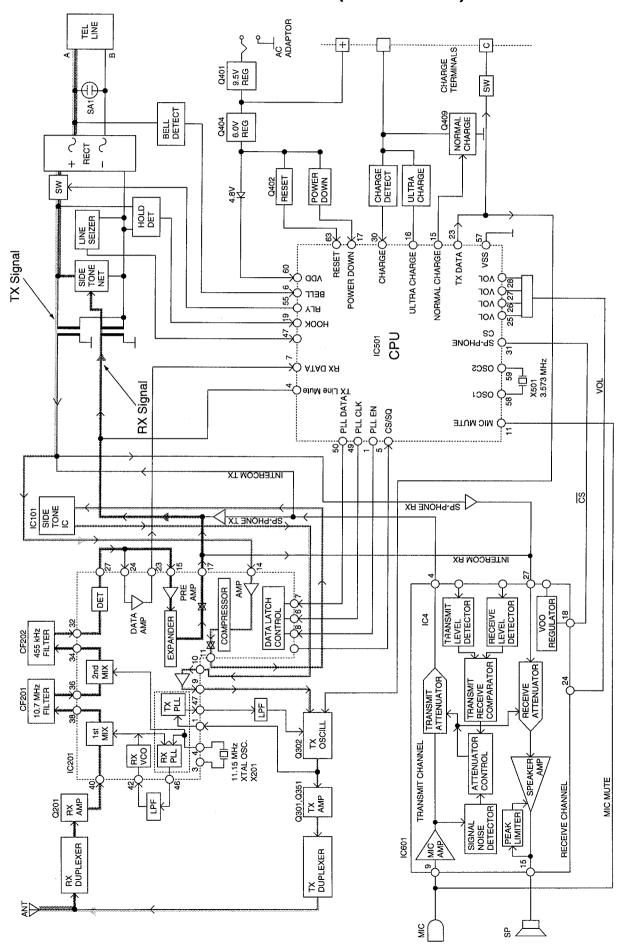


Fig. 7

BLOCK DIAGRAM (BASE UNIT)



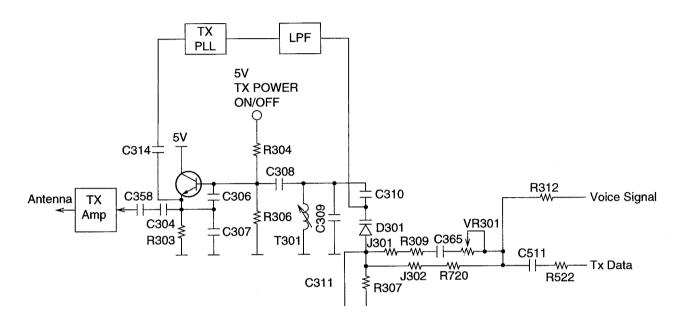
NEW CIRCUIT OPERATION (BASE UNIT)

■ TRANSMITTER CIRCUIT

The voice signal or the data signal sent to the handset is applied in the anode of the variable capacitor diode (VARICAP) D301.

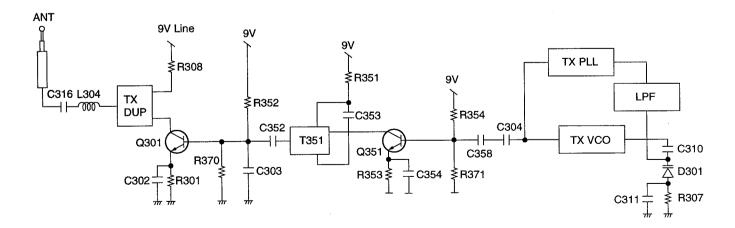
VR301 is used for changing the voice signal level, thus changing the modulation level.

Circuit Diagram



■ TRANSMITTER OUTPUT AMP CIRCUIT

The signal which is oscillated at TXVCO is amplified by Q301, which is biased by the TX duplexer T351. The signal passes through the duplexer and it is radiated from the antenna.



NORMAL CIRCUIT OPERATION (BASE UNIT)

TELEPHONE LINE INTERFACE

Circuit Operation:

ON HOOK

Q1 is open, and therefore cuts the DC loop current and cuts the voice signal. The unit is consequently in an on-hook condition.

• SPECIFICATIONS

In the on-hook state (idle), the current flows between the telephone line and the unit is as follows: $A \rightarrow L2 \rightarrow PC1 \rightarrow R1 \rightarrow S$

The AC interface impedance is over 2.2 k |; thus, satisfying the telephone company requirements.

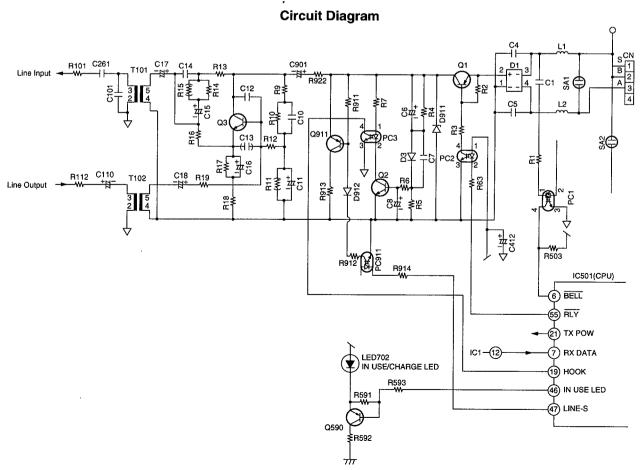
■ TELEPHONE MODE OPERATION

When a ring signal enters from the Line

- 1) The ring detection circuit, i.e., the photocoupler PC1, begins to operate and its output is input to Pin(6) of IC501 (CPU).
- 2) To send the ring signal to the handset, Pin(2) of IC501 enters into the transmit mode thus becoming a High and the ring data having the code set by Pin(2) of IC501 is sent to handset as a modulated output signal.
- 3) Upon receiving the ring data, and the handset is switched from standby to the talk mode, the base unit receives a carrier modulated by the data indicating a switch from standby to talk. This data is then demodulated at the base unit and passes through a data signal amplifier of IC201, This signal is then inputted to Pin 7 of IC501, via Pin of IC501 which causes Q1 and PC2 to release the muting, and enable talk.

Circuit-making from the handset

- 1) When the operator of the handset presses the talk button, data is transmitted to the base unit. This data is then demodulated by the base unit and passed through data signal amplifier of IC1 and enters Pin(7) of IC501.
- 2) When the codes coincide, Pin(21) of IC501 becomes a "High". At this time the transmit condition is enabled and the photocoupler PC2 is turned on.
- 3) An IN USE signal is sent out from Pin (6) of IC501, thus dimly lighting the IN USE/CHARGE LED (IND5).



TRANSMITTER SIGNAL CIRCUIT

Circuit Operation:

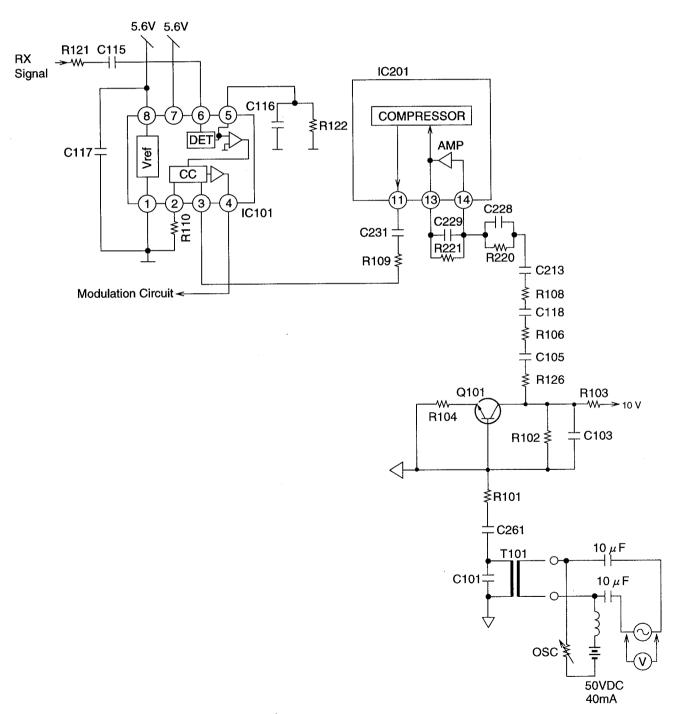
1. The signal input from the TEL LINE goes through tel interface line transformer T101→Q101→R108→C213→(C228, R220) and it is input to the signal amplifier of IC201, pin(14).

This amplifier is connected in a limitter configuration (by using diodes D202 and D203).

Signal goes through the compressor and it is output in the pin (1) of IC201. Then it is input to the IC101 (Sidetone IC) and goes out to the modulation circuit.

The sidetone IC is an attenuator, and its attenuation level depends on the signal level received on its pin (6) (signal received from the portable unit, that will be sent to the Tel Line).

When the signal output to the telephone line is high, the signal input from the telephone line will be attenuated by this circuit, thus decreasing the sidetone level.



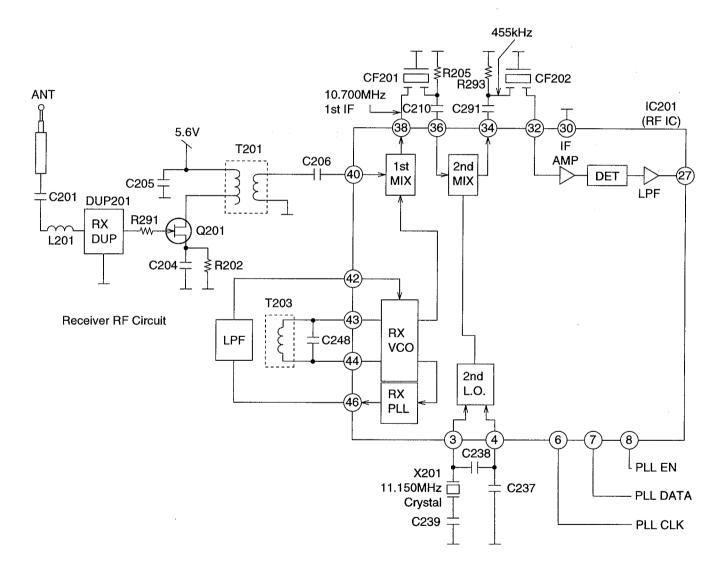
RECEIVER RF IF CIRCUIT

Circuit Operation:

The signal of 39.7~40.0 MHz band (39.775~40.000MHz) which is input from ANT is filtered at DUP201, passes through the filter AMP of 40 MHz band at T201 and Q201, and is input to Pin(40) of IC201.

RX VCO which oscillates at T203 and Pins (2), (46) of IC201 is input to program control at inside of IC201, 1st local frequency is controlled to assigned channel by serial data which is output, from Pins (1), (49) and (50) of IC501 (CPU), makes loop with Phase Detector Out and RX VCO, and locks 1st local frequency.

The input signal of Pin (40) of IC201 and 1st local frequency output from RX VCO are mixed at inside of IC201, then it passes through CF201, and 1st IF frequency of 10.700 MHz is generated. The 11.150 MHz and 10.700 MHz which are oscillated at X201 and Pins (3), (4) of IC201 are mixed at inside of IC201 and filtered at CF202, and 2nd IF 455 kHz is output.

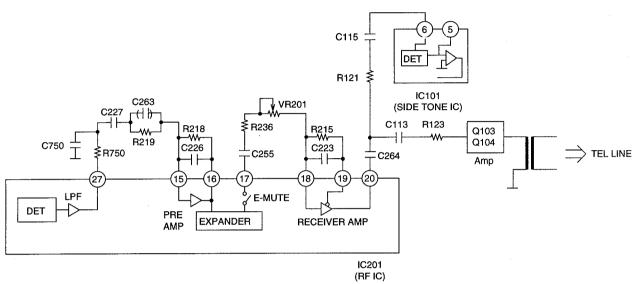


■ RECEIVER SIGNAL CIRCUIT

Circuit Operation:

- 1. The detected signal passes through R750→C227→(C263, R219) and it is input to the Pre Amplifier inside of IC201; it passes through the expander and goes out from pin(17) of IC201.
- 2. The signal passes through C255→R236→VR201→, and it is input to the Receiver Amplifier of IC201, on pin (8).
- 3. The signal is output from the amplifier on pin 20 of IC201 and it goes thru C113 and R123, to the telephone line.
- 4. The signal is also input to the IC151 (sidetone IC) in pin(6), in order to define the attenuation level of this IC.

Circuit Diagram



Note: All waveforms are measured by applying the SSG input level of reception 60 dB μ V (3.0 kHz Deviation, f=1 kHz) from antenna.

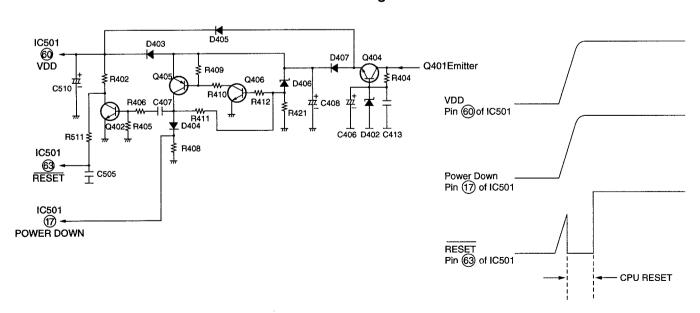
■ INITIALIZATION CIRCUIT

Function:

This circuit is used for initializing the CPU when the AC adaptor is connected.

Circuit Operation:

When the unit is switched ON, the voltage is shifted by D405 and power is supplied to the CPU.



■ CHARGE DETECT CIRCUIT

Circuit Operation:

• CHARGE MODE

When charging the handset on the base unit, CH ID CODES are sent from the CONT terminal to the handset, and charging current is supplied to the handset from the battery charge contacts via R415, R416, (R418, R423) on base unit:

When

contact on base unit is input to Pin of IC501 (CPU) through Q403 and LED702 (IN USE LED) light is on. When the

point on the handset is High level, Q202 on handset goes on and Pin and of IC202 becomes Low, In this way the CPU on handset detects the fact that the battery is charged.

• Set up of the handset

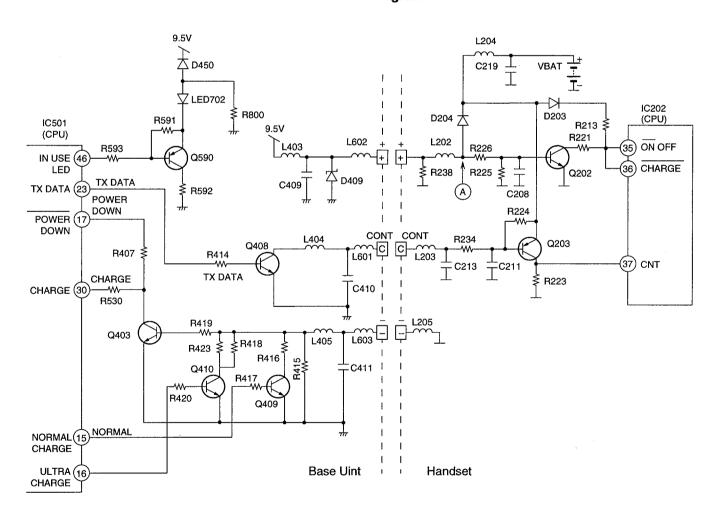
When charging the handset on the base unit, the data signal is sent from CONT terminal to handset.

The Q203 switching is controlled by Pir/29 of IC501 on base unit, the sending data are CH data. ID code, tone of

The Q203 switching is controlled by Pin(2) of IC501 on base unit, the sending data are CH data, ID code, tone or pulse mode data etc.

The data signal is sent to Pin(3) of IC202 (CPU) via Q203 on handset.

While charging this data continues to be sent to the CPU of handset.

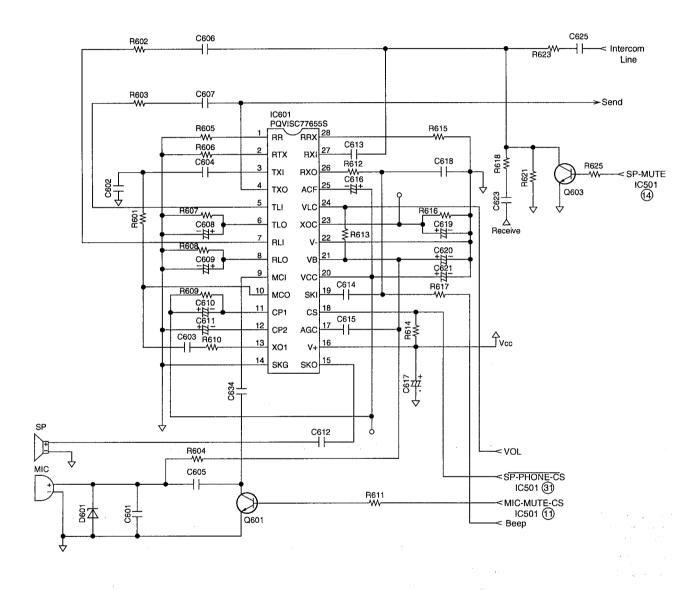


■ SPEAKERPHONE OPERATION

When a ring signal is received:

When the ring signal is received from line, photocoupler PC1 operates, the output enters Pin 6 of IC501 (CPU), Pin 1 of IC501 goes High, and the system goes into the Send mode. Also, Pin 1 of IC501 goes Low, activating IC601 (speakerphone). Next, Pin 2 of IC501, Pin 5 of IC601 output the monitor tone which enters Pin 9 of IC601 and is then output from the speaker. Subsequently, the same operation as for Line takes place.

Next, when the speakerphone switch is turned ON, the line in which the ring is ringing is selected, and Q1, goes ON, causing the line to be selected.



■ POWER SUPPLY CIRCUIT

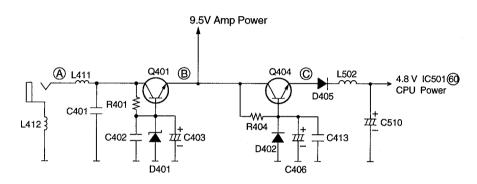
Function:

Power from the AC adaptor passes through a 2-stage regulating block consisting of Q401 and Q404 and provides system voltages of 4.8 V and 9.5 V.

Circuit Operation:

Q401 is a regulated power supply. The voltage at point (B) is regulated to 9.5 V by the zener voltage of D401→Amp power. Q402 is a regulated power supply. The voltage at point (C) is regulated to 5.5 V by the zener voltage of D402. The 5.5 V voltage is dropped by D405 to 4.8 V.

Circuit Diagram

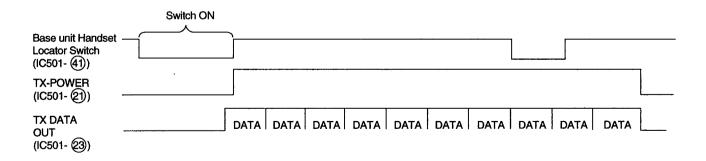


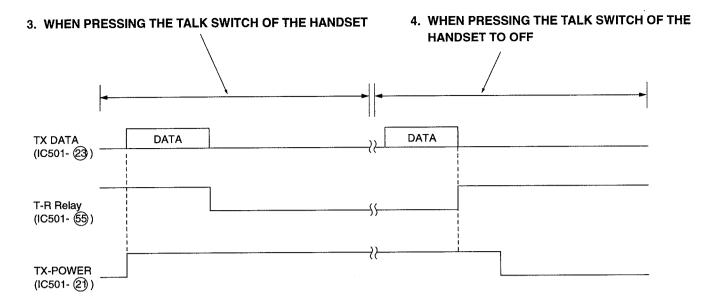
CPU OPERATION

1. TEL MODE

CPU Terminals Operation Mode	21 TX POW	23 TX DATA	55 TR-RLY
STANDBY	L	Н	Н
TALK	Н	Н	L
Base Unit → Handset Ring	Н	DATA	Н
Base Unit → Handset Paging	Н	DATA	Н
CHARGE	L	DATA	Н

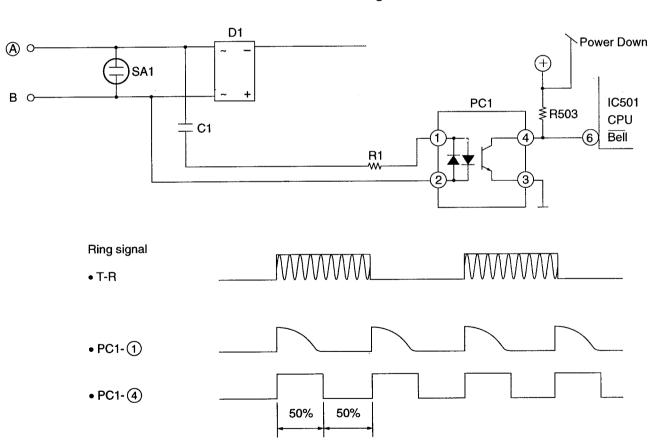
2. TIMING OF IC5 (CPU) OUTPUT PORT WITH THE BASE UNIT IN HANDSET LOCATOR MODE





5. RESONANCE PREVENTION CIRCUIT

Circuit Diagram



Make/break ratio when dialling with the handset: 40%: 60%

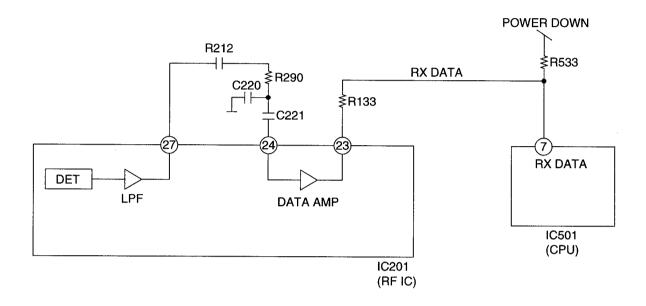
50%: 50% High/low ratio upon ring signal:

Therefore, if the low/high ratio is greater than 45% at IC501-6 (CPU), it is judged as a ring signal.

6. EXPLANATION OF THE DATA RECEIVE CIRCUIT

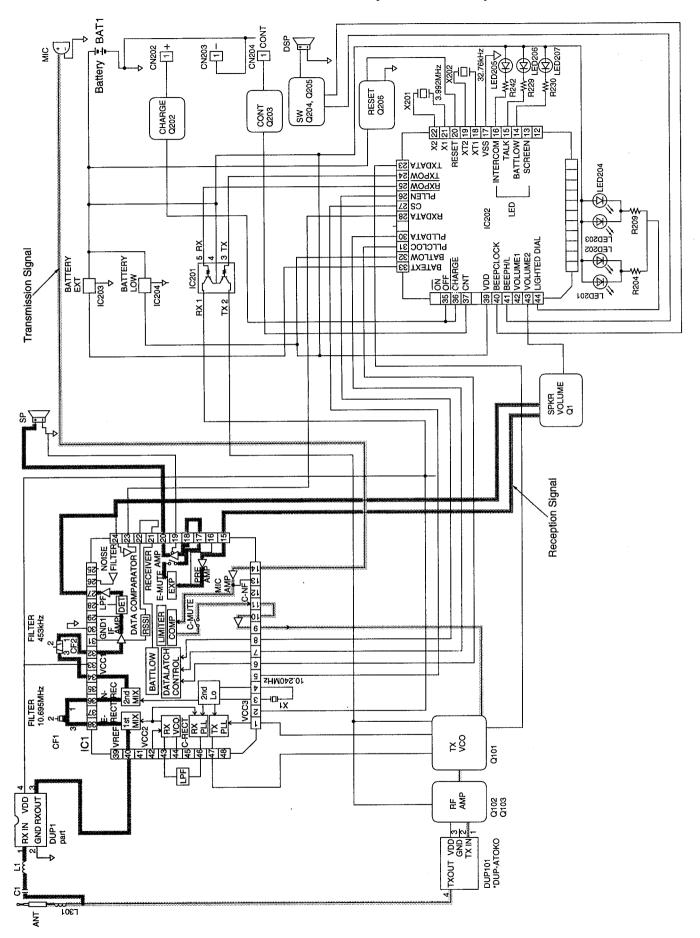
6-1. Signal Flow

Circuit Diagram



In area where the transmission power from the handset is extremely weak, noise is superimposed on the data and the chance of an error is high upon reception of the data. To help prevent this, the above circuit is used.

BLOCK DIAGRAM (HANDSET)



NEW CIRCUIT OPERATION (HANDSET)

■ RECEIVER RF IF CIRCUIT

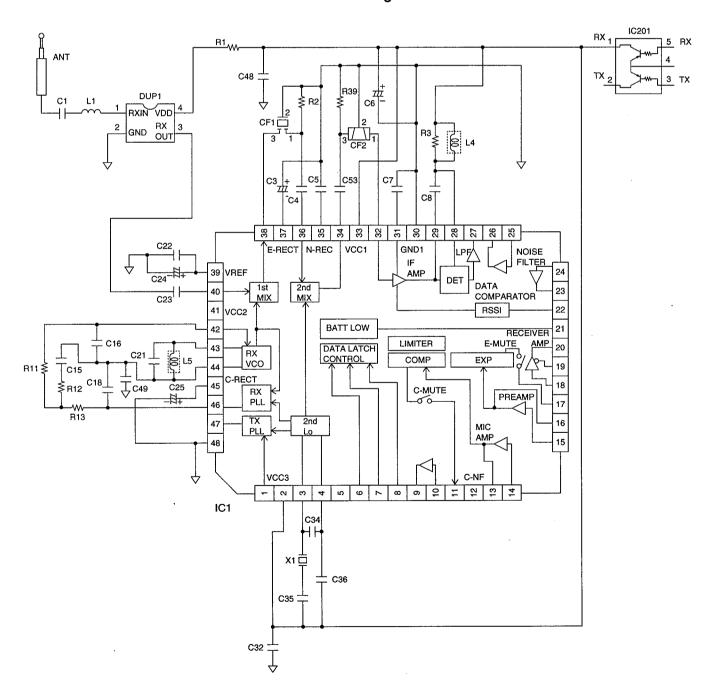
Circuit Operation:

The signal of 30 MHz band (30.075 MHz~30.300 MHz) which is input from ANT is filtered by DUP1, and is input to Pin (40) of IC1

The RX VCO which oscillates at L5 and IC1 is locked to 1st Local frequency by PLL inside IC1. (PLL is controlled by serial data output from Pin(26),(30) and(31) of IC202.)

An input signal from Pin 40 of IC1 and 1st Local frequency output from RX VCO are mixed inside IC1, pass through CF1, and 1st IF frequency of 10.695 MHz is generated.

Further, 10.695 MHz that is filtered at CF1, and 10.240 MHz that is oscillated at X1, pass through 2nd MIXER inside IC1 and are filtered at CF2 and output 2nd IF 455 kHz.



■ RECEIVER SIGNAL CIRCUIT

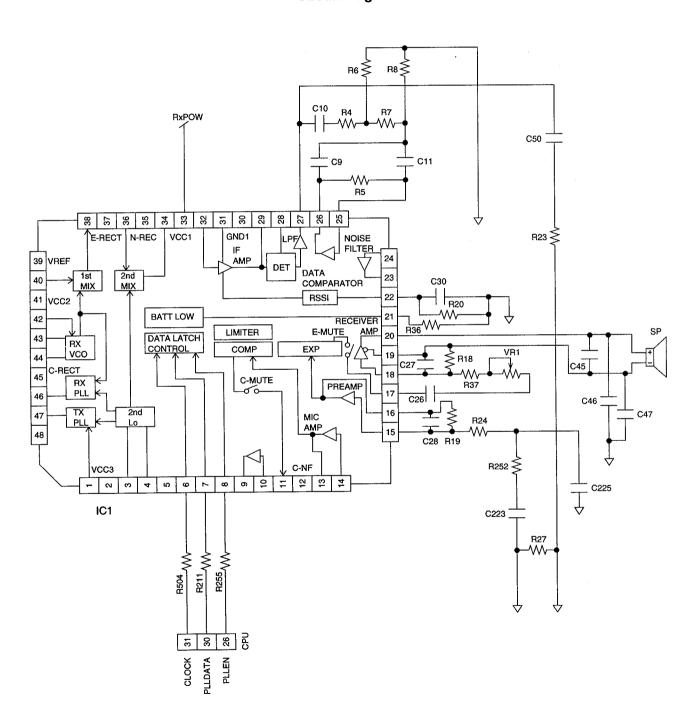
Circuit Operation:

After getting the 455kHz signal, it is input to Pin (32) of IC1 and passes through IF AMP and Detector Circuit, then are output to Pin (27).

It is an AF signal flows through C50, R23. Its level is switched by Q1 which are controlled by the CPU.

The signal is received at Pin 15 of IC1, then it passes through the following circuits: PREAMP, Expander and Amplifier: It goes out at Pin 20 and finally is sent to the SP.

Inside IC1, E-MUTE, C-MUTE and PLL circuits are controlled by the serial data from the CPU (from Pins(26),(31) and(32)).

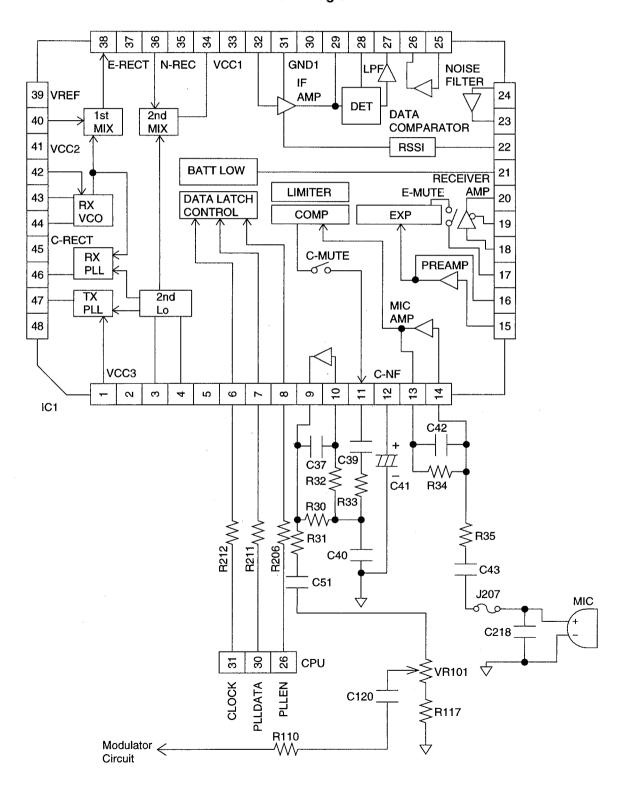


■ TRANSMITTER SIGNAL CIRCUIT

Circuit Operation:

Input signal from MIC passes through the filters arranged by C43,R35 and C42,R34 and it is input to the Pin (4) of IC1. Inside it, the signal passes through the MIC AMP and Compressor circuits and is output to Pin (1).

It flows through C39, R33, R30, R31, C51 and VR101, then is input to modulator circuit.

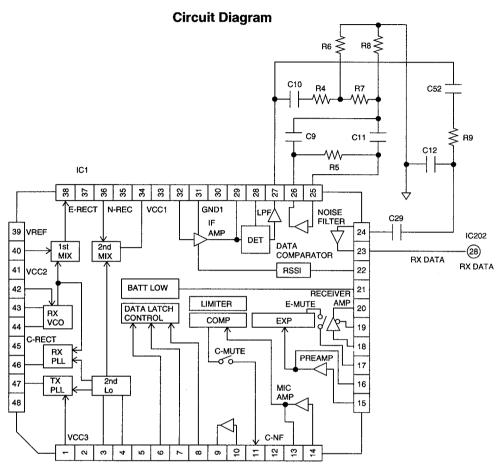


■ RECEIVER DATA CIRCUIT

Circuit Operation:

Only the data received is passed through the low pass filter formed by R9 and C12 to be input at pin(24) of IC1, where the wave form is adjusted.

The resulting signal is output from Pin(23) and sent to CPU directly.



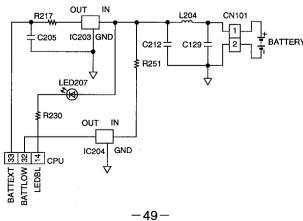
■ BATTERY LOW DETECTOR CIRCUIT

Circuit Operation:

When the battery voltage reduces to less than 3.55 V, this level is detected at the input of IC 204, so its output switches from a high state to low state.

The CPU detects this level at Pin(32) and battery low indicator lights starts flashing.

IC203 monitors the level of the battery, if this level is less than 3.0 V, the output of IC203 switches to low state, then CPU stops stops working to maintain memory.



NORMAL CIRCUIT OPERATION (HANDSET)

CPU OPERATION

CPU Terminals Operation Mode	23 TX DATA	25 RX POW	24 TX POW	41 BEEP	15 TALKLED
STANDBY	L	Intermittently H or L	Н	Н	Н
TALK	L	L	L	Н	L
Base Unit → Handset Ring		L	Н	L	FLASHING
Base Unit → Handset			Н		Н
Paging	<u>—</u>	_	11	_	''
CHARGE	L	Н	Н	Н	Н
During (TALK)	_	L	L	Н	L
Handset PULSE DIAL	DATA	L	L	Н	L
Handset TONE DIAL	DATA	L	L	Н	L
Handset OFF MODE	L	Н	Н	Н	Н

■ RESET CIRCUIT POWER ON/OFF CIRCUIT

Reset circuit:

There are two ways to reset CPU.

- 1. When the battery is connected, there is an impulse through C210 then Q206 generates an reset signal which is received in Pin 20 of CPU.
- 2. When the handset is charged, the impulse is sent through C209,Q206 generates the reset signal and it is sent to Pin 20 of CPU.

Circuit Diagram Timing Chart IC203 R217 33 BATTERY Battery CPU (33) C205 CN101 L204 CPU RESET BATTERY CPU (20) C212 C129 D203 **Battery Voltage** R220 3.0V Terminal L202 Memory Hold Mode 1 + C209 CPU R241 20 RESET **Battery Connection** Low Battery Detection C210 Q206

TROUBLESHOOTING GUIDE

Symptom	Refer to page	Unit for repair
The base unit does not respond to a call from handset.		
The base unit does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and handset is less than normal.		
The reception sensitivity of base unit is low with noise.	20, 21	_
The transmit level is high or low.		Base Unit
The reception level is high or low.		
The unit does not link.	·	
The base unit does not flash In Use/Charge indecator.	53	_
The charge indicator does not light.	54	
The IN USE/Charge indicator does not flash.	54	
The beep is not heard from the handset.	54	
The setting of Battery Low indicator is wrong.		
The handset does not respond to a call from base unit.		
The handset does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	31, 32	
The reception sensitivity of handset is low with noise.		Handset
Does not link between base unit and handset.		
The reception level is high or low.		
The transmit level is high or low.		
The handset does not enter the battery save mode.	55	
The beep is not heard on the handset.	56	
The TALK indicator does not flash.	56	

TROUBLESHOOTING GUIDE (BASE UNIT)

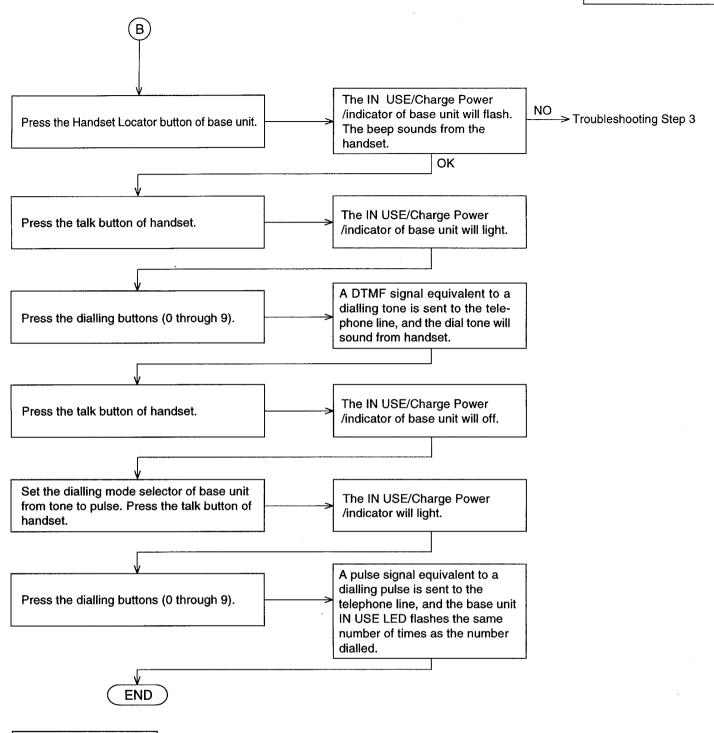
Base Unit Condition:

- 1. Set the Volume/Ringer button to "MAX".
- 2. Set the dialing mode selector to "Tone".

When checking the base unit only

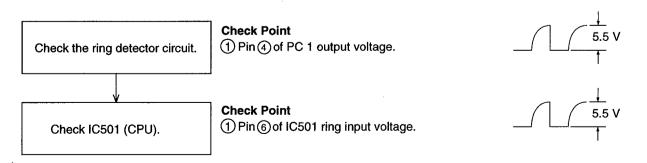
Check the base unit as shown by following below flow chart.

Operation Connect the AC adaptor (KX-A11BAXAL) plug into DC IN jack and other end into a power outlet (AC 220V-240V, 50Hz). Connect the telephone line to tel jack. Checking The Inuse/Charge Power Apply the ring signal to tel jack by the NO /indicator of base unit will be Troubleshooting Step 1 loop simulator. flashing. OK When checking the base unit and handset Operation Checking The Inuse/Charge Power Charge the handset. > Troubleshooting Step 2 /indicator will light. OK Lift the handset.

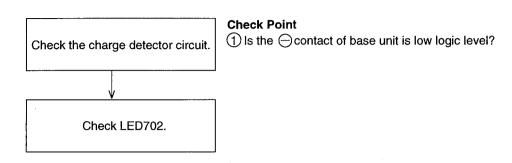


Troubleshooting Step 1:

The base unit does not flash In Use/Charge indicator.

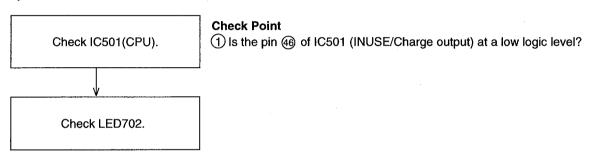


Troubleshooting Step 2: The charge indicator does not light.

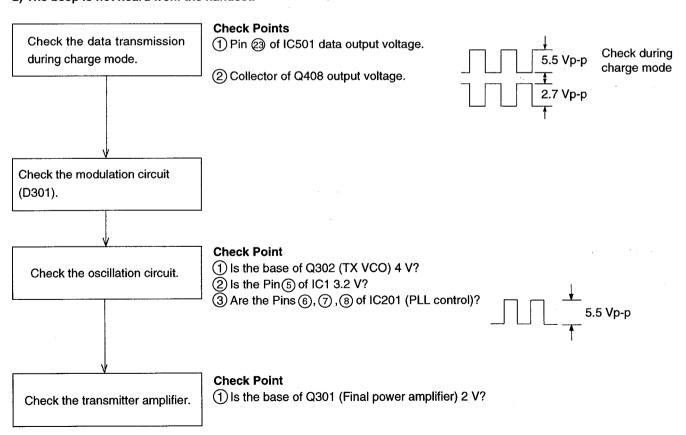


Troubleshooting Step 3:

1) The INUSE/CHARGE indicator does not flash.



2) The beep is not heard from the handset.



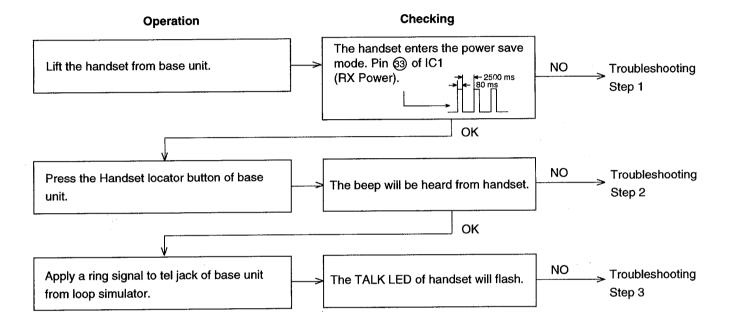
TROUBLESHOOTING GUIDE (HANDSET)

Use the right base unit for this troubleshooting. Charge the battery of the handset by the base unit.

Base unit condition:

- 1. Connect the AC Adaptor (KX-A11BAXAL) plug into DC IN jack and the other end into a power outlet (AC 220V-240V, 50Hz).
- 2. Connect the loop simulator (DC 48 V) to tel jack.

Check the handset as shown by following below flow chart.

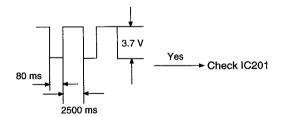


Troubleshooting Step 1: The handset does not enter the battery save mode.

Check point

(1) Pin (3) of IC1

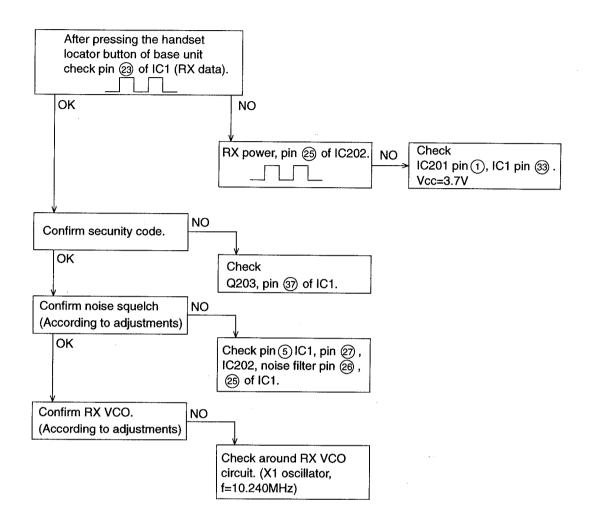
RX power output voltage



Troubleshooting Step 2:

The Beep is not heard on the Handset.

Check Points



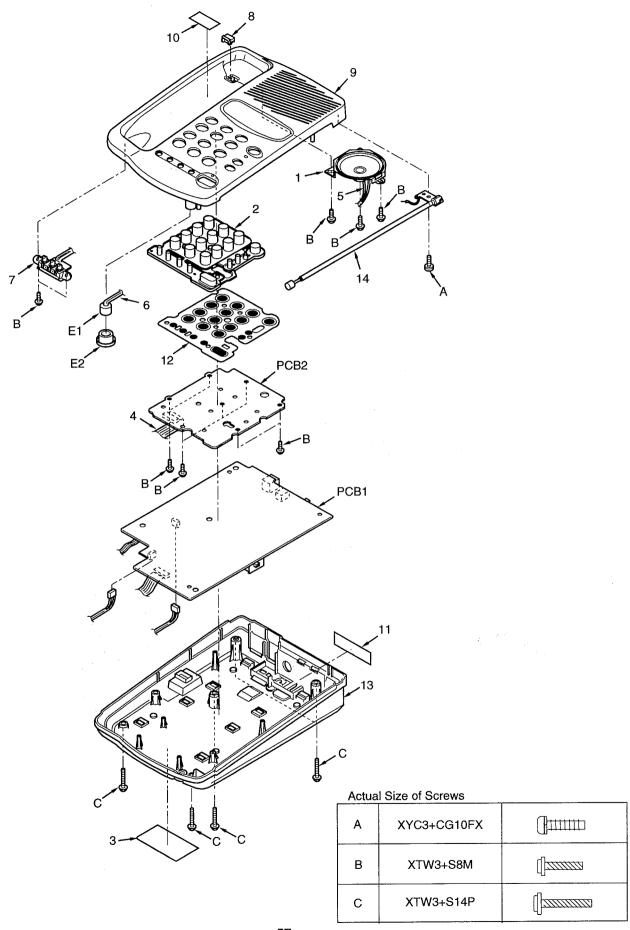
Troubleshooting Step 3:

The TALK indicator does not flash (Check the data reception).

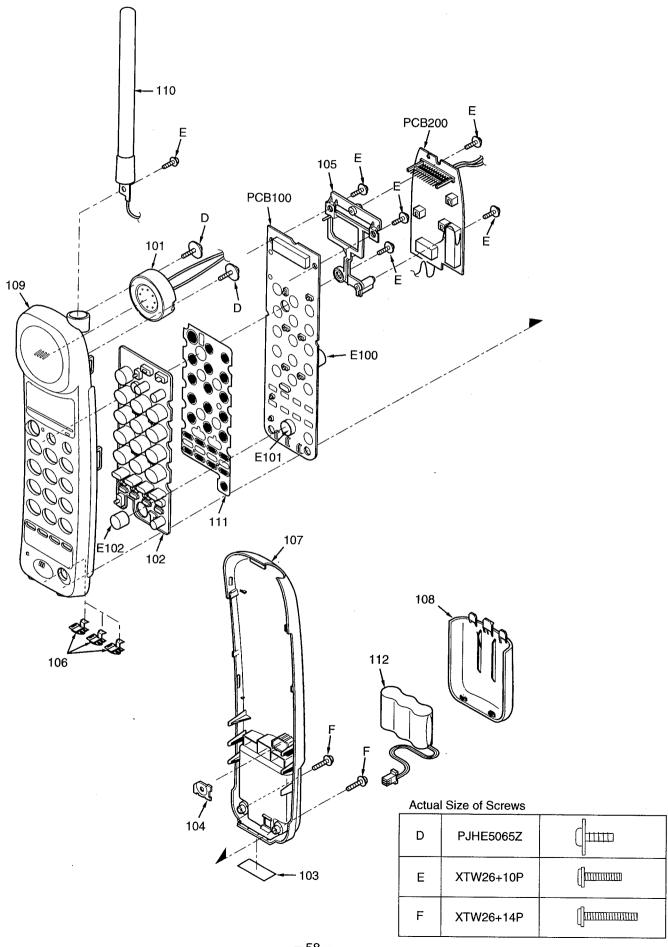
Check Point

Check the signal level of receiver data circuit on page 49.

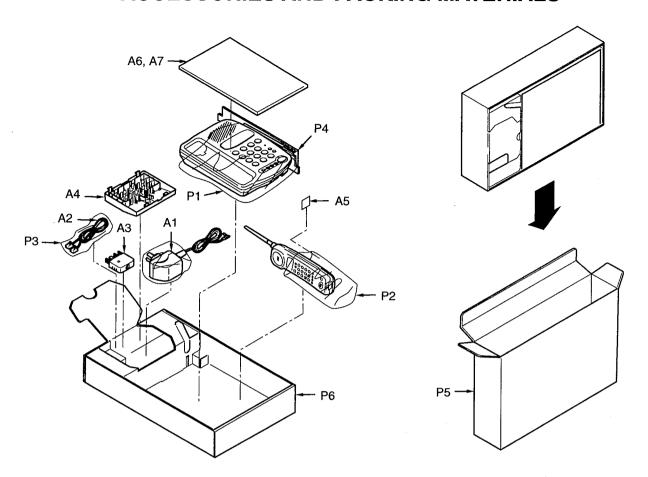
CABINET AND ELECTRICAL PARTS LOCATION (BASE UNIT)



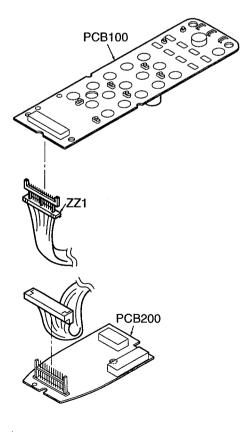
CABINET AND ELECTRICAL PARTS LOCATION (HANDSET)



ACCESSORIES AND PACKING MATERIALS



EXTENSION CABLE CONNECTING METHOD



This replacement parts list is only for the model: KX-TC187AL-W.

Ref. No.

Part No.

Pcs/Set

Part Name & Description

MAIN P.C.BOARD PARTS

REP	LACEN	IENT	ΓΙ	PA	R٦	ΓS	LI	ST			
						Ва	se	Uni	t		
Note:									_		
	RTL (Retention Time Limited)										
After the discon to be available f is dependent on governing part a After the end of	The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.										
2. Important safety	notice.										
Components ide safety. When re specified parts.											
3. The S mark indic	ates service	standard	par	s and	ma t	ay diffe	er fro	m produ	ction		
parts.											
4. RESISTORS & C	APACITORS										
Unless otherwise	•										
All resistors are i											
All capacitors are		ARADS (μF)	P=	ιμF						
*Type &Wattage	of Resistor										
Туре									-		
ERC:Solid	ERX:Metal I		,	R:Ca							
ERD:Carbon	ERG:Metal					Resis			l		
PQRD:Carbon	ER0:Metal F	-IIM	ERF	:Cen	nent	Resis	tor]		
Wattage	144 DE 474W	140	4 (0)					L 0. 0\1/	Loove		
10,16:1/8W *Type & Voltage	14,25:1/4W	112	1/20	<u> </u>		1:1W		2:2W	3:3W		
Type & Voltage	Ji Capacitoi										
ECFD:Semi-Cond	uctor	ECCD I	CKI) EC	OT C	OC D	~ · C	Ceramic			
ECQS:Styrol	uctor	ECQE,									
PQCUV:Chip		ECEA,					COLGI				
ECQMS:Mica		ECQP									
Voltage		LOG	. 1 01	ypior	yici	10					
	CQG	ECSZ 1	vne				Otl	hers			
	CQV Type		,,,,				011		i		
	5: 50V	0F:3.1	δV	OJ	.6.	3V		1V :3	35V		
	1:100V	1A:10\		1A				50,1H:5			
1	:200V	1V:35\		1C				· ·	3V		
2H:500V		0J:6.3		1E,2					00V		
<u> </u>				·							
	·										

Ref. No.	Part No.	Part Name & Description		Pcs/Set					
CABINET & ELECTRICAL PARTS									
1	PQAS65P37Z	SPEAKER		1					
2	PQBX10284W	BUTTON, 20KEY		1					
3	PQGT13402Z	NAME PLATE		1					
4	PQJE10087Z	LEAD WIRE		1					
5	PQJS02P24Y	CONNECTOR (SP)	6	1					
6	PQJS02P27X	CONNECTOR (MIC)		1					
7	PQJT10136Z	CHARGE TERMINAL HANGER		1					
8	PQKE10066Z1	111111111111111111111111111111111111111	•]					
9	PQKM10285P3	UPPER CABINET		1					
10	PQQT11664Z	WALL MOUNT LABEL							
11 12	PQQT11669Z	ADAPTOR LABEL SHEET SWITCH		,					
13	PQSX10059Z PQYF10117Q1	LOWER CABINET S		1					
14	XEAPQK170D	ANTENNA	, I	1					
14	XEAPQK170D	ANTENNA		'					
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PCB1 PQWP1C187ALH P.C.BOARD ASS'Y (RTL)	S 1	
IC101 AN6183SAE1 IC IC201 PQVIT31224AH IC IC501 MN150832KK IC	1	
IC101 AN6183SAE1 IC IC201 PQVIT31224AH IC IC501 MN150832KK IC	1	
IC101 AN6183SAE1 IC IC201 PQVIT31224AH IC IC501 MN150832KK IC	1	
IC201 PQVIT31224AH IC IC501 MN150832KK IC	1	
IC501 MN150832KK IC		
1 1	1 1	
10001 11 4 100 17 0000		
1 1	1	
(TRANSISTORS)		
Q 1 2SA1625 TRANSISTOR(SI) (or 2SA1776P)	1 1	
Q 2 2SC1740S TRANSISTOR(SI) (or 2SC3330)	1	
Q 3 PQVTKSD261CY TRANSISTOR(SI)	1	
Q101 2SD1819A TRANSISTOR(SI)	1	
Q101 2SD1819A TRANSISTOR(SI) Q102 2SD1819A TRANSISTOR(SI)		
Q103 2SD1819A TRANSISTOR(SI)	l i	
Q104 2SD1819A TRANSISTOR(SI)	1	
Q105 PQVTFB1A4M TRANSISTOR(SI)	1	
Q201 2SK543 TRANSISTOR(SI)	1	
Q202 2SD1819A TRANSISTOR(SI)	1	
Q301 PQVTMSC2295C TRANSISTOR(SI)	1	
Q302 2SC2412K TRANSISTOR(SI)	1	
Q303 2SB709A TRANSISTOR(SI)	S 1	
Q304 2SD1819A TRANSISTOR(SI)	1	
Q351 PQVTMSC2295C TRANSISTOR(SI)	1	
Q401 2SD2137 TRANSISTOR(SI)	1	
Q402 2SD1819A TRANSISTOR(SI)		
Q403 2SD1994A TRANSISTOR(SI)	1	
Q404 2SD1991A TRANSISTOR(SI)	1	
Q405 2SB709A TRANSISTOR(SI)	S 1	
Q406 2SD1819A TRANSISTOR(SI)	1	
Q408 2SD1994A TRANSISTOR(SI)	1	
Q409 2SD1991A TRANSISTOR(SI)	1	
Q410 2SD1991A TRANSISTOR(SI)	1	
Q590 2SB1218A TRANSISTOR(SI) (or 2SA1603R)	1	
Q601 2SD1819A TRANSISTOR(SI)	1	ı
Q602 2SD1819A TRANSISTOR(SI)	1	
Q603 2SD1819A TRANSISTOR(SI)	1	
Q604 2SD1819A TRANSISTOR(SI)	1	
Q911 2SA1625 TRANSISTOR(SI) (or 2SA1776P)	1	
Q941 2SD1819A TRANSISTOR(SI)	1	
Q942 2SB1218A TRANSISTOR(SI)	1	
Q943 2SD1819A TRANSISTOR(SI)	1	
(DIODES)		
D 1 PQVDS1ZB40F1 DIODE(SÍ)	3 1	
D 3 1SS119 DIODE(SI)	1	١
(or MA165 or 1SS133)		
D250 MA110 DIODE(SI)	1 1	
D251 MA110 DIODE(SI)	¦	
D301 PQVDKV1832C3 DIODE(SI)	1	┙

Date Date Diode(s) Diode	Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Part Name & Description	Pcs/Se
MA100	D303	MA110	DIODE(SI)	1				
MACHES DIODE(S) 1 1 1 1 1 1 1 1 1				1		D .		
DADIEST DIODE(S) Correction Correcti				1 , 1	DUP301	ELB6F001	COMPONENTS PARTS	'
DOM						1		
DIAM MA110 DIODE(S) DIOD	D403	192118		'				1
Discription Discription	D404	MA110	•	1 1			(JACKS)	
DAMP DAMPS				1 1		PQJJ1B4Y		
MA700A MA700A MA700A DIODE(SI) 1 1 1 1 1 1 1 1 1			(or MA165 or 1SS133)		CN4	PQJJ1TA15Z	JACK, TEL	1
DAGG DECENTRISER 2 2.2 1 1 1	D406	MA4047	DIODE(SI)	1 1				
Diode Diod	D407	MA700A			1			
MA4043 DIODE(SI)	D409	ECEA1HKS2R2	2.2	1	l		(DUOTO COUDI EDC)	1
District District	D450	MA4043	DIODE(SI)	1			PHOTO ELECTRIC TRANSDUCER A	
Decoration Dec	D508	MA110	DIODE(SI)	1	РСЗ	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER A	1
Diode(si) S	D511	MA161	DIODE(SI) S	1	PC911	PQVITLP627	PHOTO ELECTRIC TRANSDUCER A	1
Diode(si) S 1 SA1	D601	MA4150			1			
Decision Diode(si) Dio	1			1 1	1			1 .
Display				1 .		1		
D911 MA4330M DIODE(SI) 1	D908	1SS119		1 1	SA2	PQVDDSP302M	VARISTOR	1 '
CF201	D911	MA4330M		1 1				
CP201							·	1
CP201	İ		1		l			1 .
CF201			(OEDANIO EII TEDO)				I .	
Correction Correction Constitution Constitu	05001	DOVEDEE407141			VH301	EVINDXAAU3B15	VARIABLE RESISTOR	` '
COUNCETOR CONNECTOR CONN			1					
L202 PQLQZK2R2K COIL 1 COIL COIL 1 COIL	CF202	PQVFCFW5450F	CENAIVIIC FILTER	'				
COILS AND TRANSFORMERS 1							(CONNECTORS)	İ
L202 PQLQZK2R2K COIL 1 SP PQJP02B59Z CONNECTOR 1 L304 PQLQXF18ZK COIL 1 SW501 COTHERS) COTHERS) L404 PQLQXF3R3K COIL 1 SW501 SW501 SWTCH, RINGER SELECTOR 1 L406 PQLQXF3R3K COIL 1 E2 PQMG10020Z MIC SPACER 1 L411 PQLQXF100K COIL 1 E2 PQMG10020Z MIC SPACER 1 L601 PQLQZM101K COIL 1 E2 PQMG10020Z MIC SPACER 1 L602 PQLQZM101K COIL 1 R ERDS2TJ223 22K 1 L502 PQLQZM100K COIL 1 R 2 ERDS2TJ223 22K 1 T101 PQLT3E3A I.F. TRANSFORMER Δ 1 R 2 ERDS2TJ472 4.7K 1 T201 EQVTEL118B COIL 1 R 6 PQAR10XJ623 <td></td> <td></td> <td></td> <td></td> <td></td> <td>B Comment of the comm</td> <td></td> <td></td>						B Comment of the comm		
December Colic			1,			I .	1	
L404 PQLQXF3R3K COIL 1 SW501 PQLQXF3R3K COIL 1 SW501 E1 PQLQXF3R3K COIL 1 SW501 E2 PQLMT22Z MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW501 PQLMT2ZZ MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW501 PQLMT2ZZ MICROPHONE 1 SW1TCH, RINGER SELECTOR MICROPHONE 1 SW501 PQLMT3CH MICROPHONE 1 SW501 PQLMT	L202	PQLQZK2R2K	COIL	1 1	SP	PQJP02B59Z	CONNECTOR	1
L405 PQLQXF3R3K COIL 1 SW501 PQS3A17W SWITCH, RINGER SELECTOR 1 SW501 PQLQXF3R3K COIL 1 E1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLT3E3A I.F. TRANSFORMER	L304	PQLQZK1R2K	COIL	1				ē.
L405 PQLQXF3R3K COIL 1 SW501 PQS3A17W SWITCH, RINGER SELECTOR 1 SW501 PQLQXF3R3K COIL 1 E1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXF100K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLQXM101K COIL 1 PQLT3E3A I.F. TRANSFORMER							(OTHERS)	
L406 PQLQXF3R3K COIL 1 L411 PQLQXF100K COIL 1 L411 PQLQXF100K COIL 1 L601 PQLQXF100K COIL 1 L602 PQLQXM101K COIL 1 L502 PQLQXM101K COIL 1 T101 PQLT3E3A I.F. TRANSFORMER			1 - ·		SWE01	POSS3A17W		1
L411			ł .					
L411 PQLQXF100K COIL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.406	FULUAFOROR	COIL				1	
L412 PQLQXF100K COIL 1 L601 PQLQZM101K COIL 1 L602 PQLQZM101K COIL 1 L502 PQLQZM100K COIL 1 T101 PQLT3E3A I.F. TRANSFORMER	L411	PQLQXF100K	COIL	1				
L602 PQLQZM101K COIL 1 1	L412			1				
L602 PQLQZM101K COIL 1 1							 	
L603 PQLQZM101K COIL 1							İ	1
L502 PQLQZM100K COIL 1 R 1 ERDS2TJ223 22K 1 1 1 1 R 1 ERDS2TJ104 100K 1 1 1 R 1 ERDS2TJ104 100K 1 1 1 R 2 ERDS2TJ104 100K 1 1 1 R 2 ERDS2TJ104 100K 1 1 R 3 ERDS2TJ104 100K 1 1 R 3 ERDS2TJ472 4.7K 1 1 R 4 PQ4R10XJ683 68K S 1 PQ4R10XJ683 68K S 1 PQ4R10XJ223 22K S 1 R 5 PQ4R10XJ223 22K S 1 R 5 PQ4R10XJ223 22K S 1 R 6 PQ4R10XJ682 6.8K S 1 PQ4R10XJ682 6.8K S 1 PQ4R10XJ682 6.8K S 1 R 7 ERDS2TJ682 6.8K S 1 R 7 ERDS2TJ682 6.8K S 1 R 9 ERDS2TJ331 330 1 1 1 R 9 ERDS2TJ331 330 1 1 1 1 R 10 PQ4R10XJ322 3.3K S 1 R 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10XJ322 3.3K S 1 PQ4R10				1				1
L502 PQLQZM100K COIL 1 R 1 ERDS2TJ223 22K 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Lous	FULUZIVITOTA		'		1	(RESISTORS)	
T101 PQLT3E3A I.F. TRANSFORMER A 1 R 2 ERDS2TJ104 100K T102 PQLT3E3A I.F. TRANSFORMER A 1 R 4 PQ4R10XJ223 22K T201 EQV7EL118B COIL 1 R 6 PQ4R10XJ223 22K T202 PQLI2B201 COIL 1 R 7 ERDS2TJ682 6.8K T203 PQLA7A13 COIL 1 R 9 ERDS2TJ331 330 1 T301 PQLA7A27 COIL 1 R10 PQ4R10XJ332 3.3K T351 PQLA7A19 COIL 1 R10 PQ4R10XJ152 1.5K T351 PQLA7A19 COIL 1 R10 PQ4R10XJ103 10K S 1 T351 PQLA7A19 COIL 1 R12 PQ4R10XJ103 10K S 1 R13 ERDS2TJ200 22 R14 PQ4R10XJ102 1K S 1 R16 ERDS2TJ151 150 TX201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R18 ERDS1TJ390 39 S 1 TX501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0 1	L502	PQLQZM100K	COIL	1		ERDS2TJ223	22K	
T102 PQLT3E3A I.F. TRANSFORMER							II.	
T201 EQV7EL118B COIL 1 R 6 PQ4R10XJ223 22K S 1 T202 PQLI2B201 COIL 1 R 7 ERDS2TJ682 6.8K S 1 T203 PQLA7A13 COIL 1 R 9 ERDS2TJ331 330 1 T301 PQLA7A27 COIL 1 R10 PQ4R10XJ152 1.5K S 1 T351 PQLA7A19 COIL 1 R10 PQ4R10XJ332 3.3K S 1 T351 PQLA7A19 COIL 1 R12 PQ4R10XJ103 10K S 1 R13 ERDS2TJ220 22 1 R14 PQ4R10XJ102 1K S 1 R15 PQ4R10XJ102 1K S 1 R16 ERDS2TJ151 150 1 R17 ERDS1TJ330 33 S 1 TX201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R18 ERDS1TJ390 39 S 1 X501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0			The state of the s					
T201 EQV7EL118B COIL 1 R 6 PQ4R10XJ682 6.8K 6.8K S 1 T202 PQLI2B201 COIL 1 R 7 ERDS2TJ682 6.8K 1 1 T203 PQLA7A13 COIL 1 R 9 ERDS2TJ331 330 330 1 T301 PQLA7A27 COIL 1 R 10 PQ4R10XJ152 1.5K S 1 T351 PQLA7A19 COIL 1 R 12 PQ4R10XJ332 3.3K S 1 R13 ERDS2TJ202 22 22 1 1 R 14 PQ4R10XJ102 1K S 1 R14 PQ4R10XJ102 1K S 1 1 R 16 ERDS2TJ151 150 1 1 R16 ERDS2TJ151 150 1 1 R 17 ERDS1TJ330 33 3 S 1 X201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R 18 ERDS1TJ390 39 39 S 1 X501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R 19 PQ4R10XJ000 0 0	T102	PQLT3E3A	I.F. TRANSFORMER	1 1				
T201 PQLI2B201 COIL 1 R 7 ERDS2TJ682 6.8K 1 T203 PQLA7A13 COIL 1 R 7 ERDS2TJ331 330 1 T301 PQLA7A27 COIL 1 R10 PQ4R10XJ152 1.5K S 1 T351 PQLA7A19 COIL 1 R12 PQ4R10XJ03 10K S 1 R13 ERDS2TJ200 22 1 R14 PQ4R10XJ02 1K S 1 R16 ERDS2TJ151 150 1 R17 ERDS1TJ30 33 S 1 R18 ERDS2TJ151 150 1 R19 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R18 ERDS1TJ390 39 S 1 X201 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0	T201	EOV/7EI 110B	COIL	1 1				1
T203 PQLA7A13 COIL 1 R 9 ERDS2TJ331 330 1		1					0.0.1	
T301 PQLA7A27 COIL 1 R10 PQ4R10XJ152 1.5K S 1 R11 PQ4R10XJ322 3.3K S 1 R12 PQ4R10XJ103 10K S 1 R13 ERDS2TJ200 22 1 R14 PQ4R10XJ102 1K S 1 R16 ERDS2TJ151 150 1 R17 ERDS1TJ330 33 S 1 R17 ERDS1TJ330 33 S 1 R17 ERDS1TJ330 39 S 1 R18 ERDS1TJ390 39 S 1 R19 PQ4R10XJ000 0 1			1					
T351 PQLA7A19 COIL 1 R11 PQ4R10XJ332 3.3K S 1 R12 PQ4R10XJ103 10K S 1 R13 ERDS2TJ220 22 1 R14 PQ4R10XJ102 1K S 1 R16 ERDS2TJ151 150 1 R17 ERDS1TJ330 33 S 1 X201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R18 ERDS1TJ390 39 S 1 X501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0						DO AD ADVANCE	4 514	
T351 PQLA7A19 COIL 1 R12 PQ4R10XJ103 10K S 1 R13 ERDS2TJ220 22 1 R14 PQ4R10XJ102 1K S 1 R16 ERDS2TJ151 150 1 R17 ERDS1TJ330 33 S 1 X201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 X501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0 1	T301	PQLA7A27	COIL	1 1		1	1	
R13	T254	POLAZA10	COIL	. 1			1	
R14	1,351	F GLA/A19		1 '			1	1
R16 ERDS2TJ151 150 1	1							1
X201 PQVCK1115N3Z CRYSTAL OSCILLATOR 1 R18 ERDS1TJ390 39 S 1					R16	ERDS2TJ151		- 1
X501 PQVCK3573N9Z CRYSTAL OSCILLATOR 1 R19 PQ4R10XJ000 0		1						
ASST TOVOROS/SINSE SOSIEEMISM			1			l.	100	
R63 ERJ3GEYJ472 4.7K 1	X501	PQVCK3573N9Z	CHYSTAL OSCILLATOR	1 1	H19	PQ4H 10XJ000	ľ	1 '
	1				R63	ERJ3GEYJ472	4.7K	1

Ref. No.	Part No.	Value	Pcs	s/Set	Ref. No.	Part No.	Value		Pcs/Set
1 1	ERJ3GEYJ103	10K	1	1	R293	ERJ3GEYJ272	2.7K		1
	ERJ3GEYJ334	330K	1 7	1	i				
	ERJ3GEYJ122	1.2K	1	1	R301	ERDS2TJ151	150		1
	ERJ3GEYJ221	220	1 1	1	R302	PQ4R10XJ220	22	s	1 .
	ERJ3GEYJ105	1M	1	1	R303	ERJ3GEYJ102	1K		1
	ERJ3GEYJ393	39K	1 1	1	R304	ERJ3GEYJ223	22K	- 1	1
R107	ERJ3GEYJ103	10K	1	1	R305	ERJ3GEYJ221	220		1
R108	ERJ3GEYJ103	10K	1 1	1	R306	ERJ3GEYJ223	22K		1
R109	ERJ3GEYJ103	10K	1 1	1 I	R307	ERJ3GEYJ222	2.2K		1
					R308	ERDS2TJ220	22		1
R110	ERJ3GEYJ683	68K	1 1	1	R309	ERJ3GEYJ103	10K		1
	ERJ3GEYJ101	100	1	1	1	2	1.01		'
	PQ4R10XJ471	470			R311	PQ4R10XJ103	10K	s	1
	ERJ3GEYJ104	100K	1		R312	ERDS2TJ473	47K	٦	1
	ERJ3GEYJ103	10K	Ιi		R315	ERJ3GEYJ224	220K	ŀ	1
	ERJ3GEYJ332	3.3K			R316	PQ4R10XJ103	10K	s	1
	ERJ3GEYJ684	680K	1 1		R317	ERJ3GEYJ103	10K	۰,	
	ERJ3GEYJ820	82	'		R351	ERDS2TJ220		ı	1
''''	L1100GL10020	02	1 '	' I	R352		22	ا ہ	1
R121	ERJ3GEYJ124	120K	1 .	. 1	1	PQ4R10XJ562	5.6K	S	1
					R353	ERDS2TJ221	220	- 1	1
	ERJ3GEYJ473	47K	1		R354	ERJ3GEYJ472	4.7K		1
1 I	ERJ3GEYJ563	56K	1 1		D070	DO 4 D 4 0 1 1 2 2 2	0.04	ا ہ	
1	ERJ3GEYJ103	10K	1 1		R370	PQ4R10XJ332	3.3K	S	1
	ERJ3GEYJ223	22K	1		R371	PQ4R10XJ122	1.2K	s	1 .
	ERJ3GEY0R00	0	1	- 1					
ł I	ERJ3GEYJ683	68K	1		R401	ERDS2TJ102	1K		1
R129	ERJ3GEYJ224	220K] 1	•	R402	ERJ3GEYJ104	100K	- 1	1
			1	- 1	R404	ERDS2TJ102	1K		1
R133	ERJ3GEYJ103	10K	1		R405	ERJ3GEYJ104	100K		1
					R406	PQ4R10XJ104	100K	s	1
R201	ERJ3GEY0R00	0	1	1	R407	ERD25TJ104	100K		1 1
R202	PQ4R10XJ331	330 S	1		R408	ERJ3GEYJ104	100K	- 1	1 I
R203	ERJ3GEYJ102	1K	1 1	. 1	R409	ERJ3GEYJ104	100K	- 1	1
R204	PQ4R10XJ220	22 9			1			- 1	
		330	1		R410	PQ4R10XJ472	4.7K	s	1
		18K	1		R411	PQ4R10XJ824	820K	š	1
		8.2K	1		R412	PQ4R10XJ103	10K	s	1
		2.2K	1		R414	ERJ3GEYJ473	47K	٦I	í l
1		150K	'		R415	ERDS2TJ391	390		
n209	ENJOGETUT54	TOOK	1 '		R416	ERDS2TJ181			1
R210	ERJ3GEYJ154	150K	1		R417	ERDS2TJ103	180 10K	- 1	1
		5.6K	;		R418			- 1	1
		0.1	1 '			ERDS2TJ390	39		1
			1 1	- 6	R419	ERDS2TJ103	10K		1
		100K			D400	EDDOOT 1470	4 714	- 1	
	1	27K	1		R420	ERDS2TJ472	4.7K		1
		33K	1 1		R421	PQ4R10XJ103	10K	S	1
R219	ERJ3GEYJ123	12K	1		R423	ERDS2TJ470	47	Ì	1
D000	ED 100EV 1404	1001/	۱.		DE04	ED 100EV 1404	10016	1	
		100K	1			ERJ3GEYJ104	100K	ł	1
		68K	1				6.8K		1
		68K	1		1 1		6.8K		1
		18K	1				47K		1
		68K	1 1				100K	- [1
		10K S	1				120K	- 1	1
		100K	1				56K	1	1
R229	ERJ3GEY0R00	0	1				27K	- [1
			1		R509	ERJ3GEYJ153	15K		1
		2.7K	1						
R231	ERJ3GEYJ183	18K	1		R510	ERJ3GEYJ104	100K		1
R232	ERJ3GEYJ223	22K	1	1	R511	ERJ3GEYJ102	1K		1
R233	ERJ3GEYJ334	330K	1		R512	ERJ3GEYJ182	1.8K		1
	ERJ3GEYJ104	100K	1		R513	ERJ3GEYJ152	1.5K		1
	1	0	1				33K		1
1		22K	1				0		1
		0	1				4.7K		il
		10K	1		R517		4.7K		il
200	L		1 '				10K		i 1
R280	ERJ3GEYJ104	100K	1			L. 1000L 10100			'
ا ددود	L1 1000L 10 104	1001	1 '		R520	ERJ3GEYJ681	680		1
B200],	ED 190EV 1459	15K	1 .		B I		330K		
			1 1						1
R291 [ERJ3GEY0R00	0	1		R526	ERJ3GEYJ274	270K		

Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R530	ERDS2TJ103	10K	1	R1000	ERJ3GEY0R00	0	1
R531	ERJ3GEYJ473	47K	1				1 1
R532	ERJ3GEYJ104	100K	1	J301	ERJ3GEYJ223	22K	1 1
R533	ERDS2TJ104	100K	1	J302	ERJ3GEYJ104	100K	1 1
R534	PQ4R10XJ333	33K S	1	J306	PQ4R10XJ000	0	1 1
R536	ERJ3GEYJ332	3.3K	1	J307	PQ4R10XJ000	0	1 1
R539	ERJ3GEY0R00	0	1	J308	PQ4R10XJ000	o	1 1
1.000	2,100 012 1 01.00			J309	PQ4R10XJ000	О	1
R591	ERJ3GEYJ332	3.3K	1				
	ERJ3GEYJ121	120	1	J311	PQ4R18XJ000	o s	1
				J312	PQ4R18XJ000	o s	1 1
R593	ERJ3GEYJ332	3.3K	1		PQ4R18XJ000	1 ·	1 1
				J313			
R601	ERJ3GEYJ821	820	1	J314	PQ4R18XJ000		
R602	ERJ3GEYJ472	4.7K	1	J315	PQ4R18XJ000		
R603	ERJ3GEYJ562	5.6K	1	J316	PQ4R18XJ000	1 -	1 ' 1
R604	PQ4R10XJ222	2.2K S	1	J317	PQ4R18XJ000	o s	1
R605	ERJ3GEYJ303	30K	1	J318	PQ4R18XJ000	0 S	1 1
R606	ERJ3GEYJ683	68K	1				1
R607	ERJ3GEYJ225	2.2M	1	J320	ERJ3GEY0R00	0	1
R608	ERJ3GEYJ275	2.7M	1	J321	ERJ3GEY0R00	0	1
R609	ERJ3GEYJ104	100K	1	J322	ERJ3GEY0R00	0	1 1
1			İ	J323	ERJ3GEY0R00	0	1 1
R610	ERJ3GEYJ472	4.7K	1	J324	ERJ3GEY0R00	0	1 1
R611	ERJ3GEYJ103	10K	1	J325	ERJ3GEY0R00	0	1
R612	PQ4R18XJ332	3.3K S	1			1	1 4
R613	PQ4R10XJ472	4.7K S	1	J700	PQ4R10XJ000	lo	1
R614	ERJ3GEYJ472	4.7K	1 1				1 1
	ERJ3GEYJ183	18K	1				
R616	ERJ3GEYJ104	100K	1 1				1 1
	ERJ3GEYJ333	33K	1				1 1
	ERJ3GEYJ223	22K	1 .				1
R618		2.2K					1 1
R619	ERJ3GEYJ222	2.21	'	 			
R620	ERJ3GEYJ101	100	1				ŀ
R621	ERJ3GEYJ104	100K	1 1				Į.
R622	ERJ3GEYJ684	680K	1				
R623	ERJ3GEYJ562	5.6K	1				l i
R624	ERJ3GEYJ682	6.8K	1				1
R625	ERJ3GEYJ103	10K	1 1				
R626	ERJ3GEYJ184	180K	1 ;				1
R628	ERJ3GEYJ104	100K	1				1
	ERJ3GEYJ222	2.2K	1 4				1
R629	ENJOGE 1J222	2.21	1 . '			(CAPACITORS)	
R630	ERJ3GEYJ104	100K	1	C 1	ECQE2E224JZ	0.22 S	1
R631	ERJ3GEYJ225	2.2M	1	C 4	ECKD2H681KB	680P S	1
1	ERJ3GEYJ102	1K	1	C 5	ECKD2H681KB	680P S	1
R632		la .	1 4	C 6	ECEA1EU101	100 S	1 1
R634	ERJ3GEY0R00	0	i '	C 7	ECUV1H103KB	0.01	
D740	ED INCEA HOE	1114	4	C 8	ECEA1CKS100	10 S	
R710	ERJ3GEYJ105	1M	1		LOEATORGIOU	10	'
R720	ERJ3GEYJ564	560K	1	C10	PQCUV1E104MD	0.1 S	
1				C11	ECEA1HU470	47	1 1
R750	ERJ3GEYJ123	12K	1	C12	PQCUV1H102J	0.001 S	1
]			1	C13	PQCUV1H103KB	0.01	1 1
R800	ERJ3GEYJ472	4.7K	1	C14	PQCUV1E223KB	0.022	1
		1		C15	ECEA1CKS100	10	1 1
R911	ERDS2TJ104	100K	1	C16	ECEA1HU3R3	3.3	1 1
R912	ERDS2TJ472	4.7K	1	C17	ECEA1CKS220	22 S	1 1
R913	ERDS1TJ101	100 S		C18	ECEA1HU2R2	2.2	1 1
R914	ERJ3GEYJ472	4.7K	1 ;			1	
11817	LI BOOK TOTIL	 	'	C20	ECKDNB471MB	470P ⚠	1
R941	ERJ3GEYJ334	330К	1 1	l I			
R942	ERJ3GEYJ122	1.2K	1	C101	PQCUV1H102J	0.001	1
	ERJ3GEYJ561	560	l i	C103	ECUV1H121JCV	120P	1
R943		5.6K	1	C105	ECUV1C104KBV	0.1	1
R944	ERJ3GEYJ562	100K	1 1	C106	ERJ3GEY0R00	0	1 1
R945	ERJ3GEYJ104			C100	ECUV1C104KBV	0.1	1 1
R946	ERJ3GEYJ822	8.2K				0.1	1 1
R947	ERJ3GEYJ682	6.8K	1	C109	ERJ3GEY0R00	ľ	'
R949	ERJ3GEYJ105	1M	1	1 10110	ECEA1CKS100	10 S	1
 	DOODO40000101	0.0069	1	C110		0.1	1
R967	PQCBC1C682KX	0.0068 S	1	C111	ECUV1C104KBV	10:1	

Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
C112	ECUV1H101JCV	100P	1	C305	ECUV1H103KBV	0.01 S	1
C113	ECUV1C104KBV	0.1	1	C306	ECUV1H470JCV	47P	1 1
C115	PQCUV1E104MD	0.1 S	1	C307	ECUV1H560JCV	56P	1 1
C116	PQCUV1C105ZF	1	1 1	C308	ECUV1H220JCV	22P	1 1
C117	PQCUV1E104MD	0.1 S	1	C309	ECUV1H120JUV	12P	1
C201	PQ4R10XJ000	o	1	C310	ECUV1H150JCV	15P	1 1
C203	ECUV1C104ZFV	0.1	1	C311	ECUV1H103KBV	0.01	1
C204	ECUV1H103KBV	0.01	1	C313	PQCUV1C105ZF	1	1 1
C205	ECUV1H103KBV	0.01	1	C314	ECUV1H220JCV	22P .	1
C206	PQCUV1H102J	0.001 S	1	C316	PQ4R10XJ000	lo	l 1 l
C207	ECEA1CKS100	10 S	1	C317	ECUV1C104ZFV	0.1	
C208	ECUV1C104ZFV	0.1	i	C319	PQCUV1E104MD	0.1 S	lil
C209	ECEA1HKSR47	0.47 S	1				
2012				C351	PQCUV1H103ZF	0.01	
C210	ECUV1H102KBV	0.001	1	C352	ECUV1H220JCV	22P	1 1
C211	ECUV1C104ZFV	0.1	1	C353	ECUV1H470JCV	47P	
C212	PQCUV1E104MD	0.1 S	1	C354	PQCUV1H103ZF	0.01	1 1
C213	ECUV1C104KBV	0.1	1	C358	ECUV1H020CCV	2P	1
C214	ECUV1H270JCV	27P	1			l	l . I
C215	ECUV1C104ZFV	0.1	1 1	C365	ECUV1C104KBV	0.1	1
C216	ECEA1AU470	47	1				1 . 1
C217	ECUV1H472KBV	0.0047	1	C401	ECUV1E105ZF	1	1 1
C218	ECUV1H221JCV	220P	1	C402	PQCUV1E104MD	0.1 S	1 1
C219	ECUV1H221JCV	220P	1	C403	ECA1CM471	470P	1 1
			}	C404	ECEA1CU331	330	1
C220	ECUV1C683KBV	0.068	1 1	C406	ECEA1AU101	100	1
C221	PQCUV1E473MD	0.047 S	1	C407	PQCUV1C224ZF	0.22 S	1
C222	ECUV1H103KBV	0.01	1	C408	ECEA0JU102	1000	1
C223	ECUV1H222KBV	0.0022	1	C409	PQCUV1E104MD	0.1 S	1
C226	ECUV1H331JCV	330P S	1				
C227	ECUV1C104KBV	0.1	1	C410	PQCUV1H103KB	0.01	1 1
C228	ECUV1H472KBV	0.0047	1	C411	PQCUV1E104MD	0.1 S	1
C229	ECUV1H152KBV	0.0015	1	C412 C413	ECEA0JU331 PQCUV1E104MD	330 0.1 S	1 1
C230	ECEA1HKS010	1	1	10413	F GCOVIETO4IVID	0.1	'
C230	ECUV1C104KBV	0.1	li	C501	ECUV1H152KBV	0.0015	1
C232	ECUV1H682KBV	0.0068	1	C502	ECUV1H561JCV	560P S	
C233	ECUV1H271JCV	270P	1 1	C503	ECUV1C104ZFV	0.1	
C234	ECUV1H122KBV	0.0012		C504	ECUV1C104ZFV	0.1	1 1
C237	ECUV1H560GCV	56P	i	C505	ECUV1C104ZFV	0.1	
C238	ECUV1H470GCV	47P	lil	C507	ECUV1H220JCV	22P	1
C239	ECUV1H560GCV	56P	1	C508	ECUV1H220JCV	22P	1
C241	PQCUV1E104MD	0.1	1	C510	ECEA0JWA102	1000	1
C242	ECUV1H334ZF	0.33 S	1	C511	ECUV1C104ZFV	0.1	1 1
C243	ECEA1HKS2R2	2.2 S	1 1	C512	ECUV1H222KBV	0.0022	1 1
C245	ECEA1HKSR47	0.47 S	1	C514	ECUV1H103KB	0.01	1
C246	ECUV1H223KBV	0.022 S	1	C515	ECUV1C104ZFV	0.1	1
C247	PQCUV1E104MD	0.1 S	1	C519	ECUV1C104ZFV	0.1	1 1
C248	ECUV1H100DCV	10P	1				l 1
C249	ECUV1H102KBV	0.001	1	C551	ECUV1H103KBV	0.01 S	1
C250	ECUV1H103KBV	0.01 S	1	C601	PQCUV1H103ZF	0.01	1
C251	PQCUV1E104MD	0.1 S	1	C602	ECUV1C683KBV	0.068	1
C254	ECUV1H103KBV	0.01	1	C603	ECUV1C683KBV	0.068	1 1
C255	ECUV1C104KBV	0.1	1	C604	PQCUV1E104MD	0.1 S	1
				C605	PQCUV1E104MD	0.1 S	1
C261	ECUV1H223KBV	0.022 S	1	C606	PQCUV1E104MD	0.1 S	1 1
C263	ECUV1H272KBV	0.0027	1	C607	ECUV1H333KDV	0.033 S	1 1
C264	ECUV1A105ZFV	1	1	C608	ECEA1HKS010	1	1 1
C266	ECUV1C104KBV	0.1	1	C609	ECEA1HKS010	1	1 1
C281	ECUV1C104ZFV	0.1	1	C610	ECEA1EK470	47 S	1
1				C611	ECEA1VKS4R7	4.7 S	1
C291	ECUV1H101JCV	100P	1	C612	ECEA1VU330	33 S	1
		<u> </u>		C613	PQCUV1C105ZF	1	1
C301	PQCUV1H103ZF	0.01	1 1	C614	PQCUV1C105ZF	1,	1 1
C302	ECUV1H103KBV	0.01 S	1	C615	PQCUV1C105ZF	1	1 1
C303	PQCUV1H470JC	47P	1	C616	ECEA1CKS100	10 .	1 1
C304	ECUV1H220JCV	22P	1	C617	ECEA1AU102	1000	1 1
JJ004	I COALLIFEOGOA	<u> </u>			1	<u> </u>	·

Ref. No.	Part No.	Value		Pcs/Set
C618	ECUV1H103KBV	0.01		1
C619	ECEA1VKS4R7	4.7	s	1
C620	ECEA1EK470	47	s	1 1
C621	ECEA1AKA221	220		1 1
C623	ECUV1E183KBV	0.018		1 1
C624	ECUV1H151JCV	150P		1 1
C625	ECUV1C473KBV	0.047		lil
C626	ECUV1H103KBV	0.01		
	ECUV1H152KBV	0.0015		1 1
C627			_	i 1
C629	ECUV1H471JCV	470P	S	1
C631	ECUV1H101JCV	100P		1
C632	ECUV1C104KBV	0.1		1 1
C633	ECUV1C104KBV	0.1		1 1
C634	PQCUV1E104MD	0.1	s	1 1
C710	ECUV1H103KBV	0.01		1
C750	ECUV1H562KBV	0.0056		1
C776	ECUV1C104ZFV	0.1		1
C941	ECUV1C104KBV	0.1		1
C942	ECUV1H101JCV	100P		1
C944	ECUV1C104KBV	0.1		1 1
C945	ECEA1VU330	33	s	1 1
C946	ECUV1C104KBV	0.1	Ī	1
	OPERATIONA	L P.C.BOARD PARTS		
DODO	IPQWP2TC185BH	P.C.BOARD ASS'Y (RTL)	_	1 1
PCB2	PQWP21C185BH	P.C.BOARD ASS T (NTL)		'
LED702 LED703	PQVDPY1112H PQVDBR1112H	(DIODES) DIODE(SI) DIODE(SI)		1
CN502	PQJS14A19Z	(CONNECTORS) CONNECTOR		1

RI	PLACE	MENT	PARTS I	IST							
Handset											
Note:											
1. RTL (Retention	on Time Limited)										
The marking	The marking (RTL) indicates that the Retention Time is limited for this item.										
After the disc to be availab is dependent governing par	After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.										
2. Important saf	ety notice.										
safety. When specified part	n replacing any o	of these com	ecial characteristic ponents, use only	/ manufacturer's							
3. The S mark in	ndicates service	standard par	ts and may differ	from production							
parts.											
I .	& CAPACITORS										
1	vise specified.										
	re in ohms (Ω)										
	are in MICRO F	ARADS (μF)) Ρ= μμΕ								
1 "	age of Resistor										
Type ERC:Solid	ICDV:M-4-1	r:i Ino	10.0-1								
ERD:Carbon	ERX:Metal		R:Carbon								
PQRD:Carbon	ERO:Metal		S:Fusible Resistor: Cement Resistor:								
Wattage	CHU.Metal r	IIIII IEDI	Cement Resist	N							
10,16:1/8W	14,25:1/4W	12:1/2V	V 1:1W	2:2W 3:3W							
	ge of Capacitor	112.1/20	V 1.100	2.200 3.300							
Type	ge of Capacitor										
ECFD:Semi-Co	nductor	ECCD ECK	D,ECBT,PQCBC	· Ceramic							
ECQS:Styrol	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		V,ECQG : Polyes								
PQCUV:Chip			Z : Electrolytic								
ECQMS:Mica		ECQP : Pol									
Voltage		1200 0.	ургоруюно								
ECQ Type	ECQG	ECSZ Type		Others							
,,,,,,,	ECQV Type	.,,,,,		00.0							
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V							
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V							
2E:250V	2:200V	1V:35V	1C :16V	1J :63V							
2H:500V		0J:6.3V	1E.25:25V	2A :100V							
L											
Ref No	Part No.	Part	Name & Descrin	tion Pre/Set							

2E:250V 2H:500V	2:200V	1V:35V 1C :16V 0J:6.3V 1E,25:25V	1J :6 2A :1	00V	LED203 LED204 LED205	LNJ301MPUJA LNJ301MPUJA LNJ301MPUJA	DIODE(SI) DIODE(SI) DIODE(SI)
Ref. No.	Part No.	Part Name & Description	on	Pcs/Set	LED206 LED207	LNJ301MPUJA PQVDSLN210VC	DIODE(SI) DIODE(SI)
101 102	C. PQAX3P16Z PQBX10288M	ABINET & ELECTRICAL PARTS SPEAKER BUTTON, KEY		1 1	L201	PQLQZMR68M	(COILS)
103 104 105 106 107 108	PQGT13401Z PQHG10479Z PQHR10559Y PQJT10137Z PQKF10212X1 PQKK10081Z1 PQKM10289C5	NAME PLATE SPACER RF HOLDER CHARGE TERMINAL REAR CABINET BATTERY COVER UPPER CABINET	s s	1 1 3 1 1	L202 L203 L204 L205	PQLQZM100K PQLQZM220K PQLQZM1R0K PQLQZM1R0K PQLQR1MR68M	COIL COIL COIL COIL
110 111 112	PQSA10054Y PQSX10057Z PQXA36ASVC	ANTENNA SHEET SWITCH BATTERY	S	1	CN101 CN201	PQJP2D13Z PQJS12A36Z	(CONNECTORS) CONNECTOR CONNECTOR
					X201 X202	PQVCJ3992N9Z PQVCL3276N9Z	(CRYSTALS) CRYSTAL OSCILLATO CRYSTAL OSCILLATO
					E100 E101 E102	PQEFBDB111GP PQJM122Z PQHE10070Z	(OTHERS) BUZZER MICROPHONE MIC SPONGE

-				
I	Ref. No.	Part No.	Part Name & Description	Pcs/Set
			MAIN P.C.BOARD PARTS	
	PCB100	PQWP1C187ALR	P.C.BOARD ASS'Y (RTL)	1
	IC201 IC202 IC203 IC204	XN1116 PQVI0008GE98 PQVIS80730AL PQVIXCC3501P	(ICS) TRANSISTOR(SI) IC IC S	1 1 1
	Q201 Q202 Q203 Q204 Q205 Q206	2SD601R 2SD601R 2SB709A PQVTD123T146 PQVTD123T146 PQVT143XK146	(TRANSISTORS) TRANSISTOR(SI) S TRANSISTOR(SI) S TRANSISTOR(SI) S TRANSISTOR(SI) S TRANSISTOR(SI) S TRANSISTOR(SI) S	1 1 1 1 1
	D201 D202 D203 D204	MA110 PQCUV1C105ZF MA728 PQVDS5688G	(DIODES) DIODE(SI) CERAMIC CAPACITOR DIODE(SI) DIODE(SI)	1 1 1 1
	LED201 LED202 LED203 LED204 LED205 LED206 LED207	LNJ301MPUJA LNJ301MPUJA LNJ301MPUJA LNJ301MPUJA LNJ301MPUJA LNJ301MPUJA PQVDSLN210VC	(LEDS) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI)	1 1 1 1 1 1
	L201 L202 L203 L204 L205	PQLQZMR68M PQLQZM100K PQLQZM220K PQLQZM1R0K PQLQR1MR68M	(COILS) COIL S COIL COIL COIL COIL COIL	1 1 1 1
	CN101 CN201	PQJP2D13Z PQJS12A36Z	(CONNECTORS) CONNECTOR CONNECTOR	1
	X201 X202	PQVCJ3992N9Z PQVCL3276N9Z	(CRYSTALS) CRYSTAL OSCILLATOR CRYSTAL OSCILLATOR	1
	E100	DOEED DOLLARD	(OTHERS)	

Ref. No.	Part No.	Value		Pcs/Set	Ref. No.	Part No.	Part Name, Description, & Value	Ī	Pcs/Set
		(RESISTORS)			RF P.C.BOARD PARTS				
R27	PQ4R10XJ183	18K	S	1	PCB200	IPQWP2C187ALR	P.C.BOARD ASS'Y (RTL)		1
R201	PQ4R10XJ104	100K	S	1 1	FCB200	PQWP2010/ALN	F.O.DOAND ASST (NIL)		,
R202	PQ4R10XJ334	330K	S	1 1				Ì	
R203	PQ4R10XJ334	330K	S	1 1	1.	l	(IC)	-	
R204	PQ4R10XJ331	330	S	1	IC1	PQVIT31224AR	IC	1	1
R205	PQ4R10XJ103	10K	S			ŀ		1	
R206 R208	PQ4R10XJ472 PQ4R10XJ104	4.7K 100K	s s	1 1			(TRANSISTORS)		
	i	1		1 1	0.01	DOLETI LOCOCOCO	l' '		
R209	PQ4R10XJ331	330	S	1	Q101 Q102	PQVTMSC2295C PQVTMSC2295C	TRANSISTOR(SI) TRANSISTOR(SI)		1
R211	PQ4R10XJ472	4.7K	s	1 1	Q103	PQVTMSC2295C	TRANSISTOR(SI)		i
R212	PQ4R10XJ472	4.7K	s	1			,	- 1	
R213	PQ4R10XJ473	47K	S	1 1					
R215	PQ4R10XJ104	100K	S	1 1			(DIODES)		
R217	PQ4R10XJ333	33K	S	1 1	D101	MA840BTAKU	DIODE(SI)		1
R219	PQ4R10XJ104	100K	S	1 1	D102	MA840ATAKU	DIODE(SI)		1
Booo	DO4D40V 1470	4714		1 . 1			•		
R220 R221	PQ4R10XJ473 PQ4R10XJ122	47K 1.2K	S S	1 1	1		(CERAMIC FILTERS)		
R221	PQ4R10XJ122 PQ4R10XJ222	2.2K	S	;	CF1	PQVFSFE107MJ		s	1
R223	PQ4R10XJ103	10K	S	;	CF2	PQVFCFH455F1	CERAMIC FILTER	٦	1
R224	PQ4R10XJ332	3.3K	S	i	1012	441 011140011	OEI WING THE TETT		•
1	PQ4R10XJ104	100K	Š	1 1 1					
	PQ4R10XJ104	100K	Š		Į.		(COILS)	-	
	PQ4R10XJ681	680	s	1 1	L 1	PQLQZM1R8K	COIL		1
R229	PQ4R18XJ681	680	s	1 1	L 4	PQLI2B201	COIL		1
					L 5	PQLA7A27	COIL	-	1
	PQ4R10XJ681	680	S	1					
	PQ4R10XJ221	220	S	1	L103	PQLA7A19	COIL		1
R234	PQ4R10XJ332	3.3K	s s	1	L105	PQLA7A25	COIL		1
R238	PQ4R10XJ103	10K	. 5	1					
R240	PQ4R10XJ120	12	s	1			(CRYSTAL OSCILLATOR)		
R241	PQ4R18XJ102	1K	S	1	X1	PQVCK1024LC5	CRYSTAL OSCILLATOR	-	1
R243	PQ4R10XJ104	100K	S	1					
R245	PQ4R10XJ331	330	S	1			1		
R246	PQ4R10XJ331	330	S	1 .			1	1	
R251	PQ4R10XJ270	27	s	1			(DUPLEXS)	-	
	PQ4R10XJ124	120K	S		DUP1	PQVFR27RX	CERAMIC FILTER	-	1
11202	44111000124		Ŭ		DUP101	PQVFR27TX	CERAMIC FILTER		1
J207	PQ4R10XJ000	0		1					·
					VR1	EVNDXAA03B34	(VARIABLE RESISTORS) VARIABLE RESISTOR		4
					VR101	EVNDXAA03B35		s	1
		(CAPACITORS)						1	·
C203	ECEA0GKS221	220		1					
C205	PQCUV1C105ZF	1		1			(OTHERS)		
C208	PQCUV1H103ZF	0.01		1	CN1	PQJP12B55Z	CONNECTOR	-	1
C209	PQCUV1C105ZF	1		1					
C210	PQCUV1C105ZF	1		1 1				1	
C211	PQCUV1H103ZF	0.01	_	1 1			1	-	
C212	PQCUV1E104MD	0.1	. S	1				-	
C214	PQCUV1H470JC	47P 47P		1 1			(BEGIGTORG)	1	
C215 C216	PQCUV1H470JC PQCUV1H270JC	27P		1 1	R 1	ERJ3GEYJ220	(RESISTORS) 22	-	1
C216 C217	PQCUV1H270JC	27P			R 2	ERJ3GEYJ331	330		1
C218	PQCUV1H103ZF	0.01		1	R3	ERJ3GEYJ183	18K	-	1
C219	PQCUV1H103ZF	0.01		i	R 4	ERJ3GEYJ682	6.8K	-1	1
					R 5	ERJ3GEYJ154	150K		1
C220	PQCUV1E104MD	0.1	S	1	R 6	ERJ3GEYJ561	560		1
C221	PQCUV1H102J	0.001	S	1	R 7	ERJ3GEYJ154	150K	-	1
C222	PQCUV1C105ZF	1		1	R 8	ERJ3GEYJ562	5.6K	-1	1
C223	PQCUV1E104MD	0.1	S	1	R 9	ERJ3GEYJ153	15K	-	1
C225	PQCUV1H821JC	820P	S	1	L	1			

Ref. No.	Part No.	Value	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R10	ERJ3GEYJ561	560	1				
R11	ERJ3GEYJ822	8.2K	1	C10	ECUV1H472KBV	0.0047	1
R12	ERJ3GEYJ223	22K	1	C11	ECUV1H221JCV	220P	1
R13	ERJ3GEY0R00	0	1	C12	PQCUV1C683KB	0.068	1 1
R14	ERJ3GEYJ822	8.2K	1 1	C13	PQCUV1C105ZF	1	1
R15	ERJ3GEY0R00	0	1	C14	ECEA1CKS100	10	1
R16	ERJ3GEYJ223	22K	1 1	C15	PQCUV1C473KB	0.047	1 1
R18	ERJ3GEYJ103	10K	1 1 1	C16	ECUV1H102KBV	0.001	1 1
R19	ERJ3GEYJ124	120K	11	C17	PQCUV1C105ZF	11	1
R20	ERJ3GEYJ184	180K	1 1	C18	ECUV1H103KBV	0.01	1
			·	C19	ECUV1C104KBV	0.1	
R23	ERJ3GEYJ153	15K	1 1	10.0	LOOVIOTOTRIBV	0.1	l '
R24	ERJ3GEYJ223	22K	;	C20	ECUV1H472KBV	0.0047	1
1	E 100GE 10220		'	C21	ECUV1H470JUV	47P	li
R30	ERJ3GEYJ393	39K	1	C22	ECUV1C104KBV	0.1	
R31	ERJ3GEYJ393	139K	;	C23			
			I ' I		ECUV1H102KBV	0.001	1
R32	ERJ3GEYJ393	39K		C24	ECEA1CKS220	22	1
R33	ERJ3GEYJ393	39K	1	C25	ECSTAJ1CA225	2.2 S	1
R34	ERJ3GEYJ474	470K	1	C26	PQCUV1C224KB	0.22	1
R35	ERJ3GEYJ123	12K	1	C27	ECUV1H102KBV	0.001	1
R36	ERJ3GEYJ104	100K	1 1	C28	ECUV1H681JCV	680P S	1
R37	ERJ3GEYJ562	5.6K	1 1	C29	ECUV1C473KBV	0.047	1
R38	ERJ3GEYJ222	2.2K	1	1		1	
R39	ERJ3GEYJ222	2.2K	1 1	C30	ECUV1H103KBV	0.01	1
		1		C32	ECUV1C104KBV	0.1	li
R101	ERJ3GEYJ561	560	1 1	C34	ECUV1H510GCV	51P	li
R102	ERJ3GEYJ220	22		C35	ECUV1H560GCV	56P	1
R103	ERJ3GEYJ223	22K		C36	ECUV1H560GCV	56P	1 1
R104	ERJ3GEYJ273	27K		C37	1		
			1 1		ECUV1H221JCV	220P	1
R105	ERJ3GEYJ101	100	1 1	C38	ECUV1H681JCV	680P S	1
R106	ERJ3GEYJ220	22	1	C39	ECUV1H223KBV	0.022 S	1
R108	ERJ3GEYJ472	4.7K	1				
R109	ERJ3GEYJ822	8.2K	1	C40	ECUV1H562KBV	0.0056	1
1				C41	ECEA1HKS010	1	1
R110	ERJ3GEYJ393	39K	1	C42	ECUV1H151JCV	150P	1
R111	ECUV1H3R0BCV	3	1	C43	ECUV1H223KBV	0.022 S	1
R112	ERJ3GEYJ820	82	1	C45	ECUV1H102KBV	0.001	1
R113	ERJ3GEYJ683	68K	1	C46	ECUV1H102KBV	0.001	1 1
R115	ECUV1C104KBV	0.1	1	C47	ECUV1H102KBV	0.001	1
R116	ERJ3GEYJ683	68K	1	C48	ECUV1C104KBV	0.1	1 1
R117	ERJ3GEYJ154	150K	1	C49	ECUV1H103KBV	0.01	li
1,	LINGULTUTOT	10011	'	1010	LOGVIIIIONEV	0.01	l '
R500	ERJ3GEYJ2R2	2.2	1	C50	ECUV1C104KBV	0.1	1
R501	ERJ3GEYJ183	18K	1	C51	ECUV1H103KBV	0.01	1
R502	ERJ3GEYJ103	10K		C52	ECUV1C104KBV	0.1	li
11302	LINGGLIGIOS	l lok	' I	C53	ECUV1H820JCV	82P	;
				1000	2007111020007	02.	'
				C102	ERJ3GEY0R00	О	1
				C104	ECUV1H220JCV	22P	1
		l		C105	ECUV1H103KBV	0.01 S	1 1
ļ i		l		C106	ECUV1H680JCV	68P	
		l		C100	ECUV1H680JCV	68P	
						2P	
				C108	ECUV1H020CCV		1
]		C109	ERJ3GEYJ332	3.3K	1
		l ·		0110	ECHATH 100 KB/1	0.01	,
				C110	ECUV1H103KBV	0.01	1
				C111	ECUV1H220JCV	22P	1
				C113	ECUV1H150JRV	15P	1
				C114	ECUV1H103KBV	0.01	1
				C115	ECUV1H103KBV	0.01 S	1
<u> </u>		_		C116	ECUV1C104ZFV	0.1	1
; l		(CAPACITORS)		C117	ECUV1H220JCV	22P S	1
C 1	ERJ3GEY0R00	0	1	C118	ECUV1H3R0BCV	3	1
C 2	ECUV1H103KBV	0.01 S	1	1			
СЗ	ECST1EY474	0.47	1	C120	ECUV1C104KBV	0.1	1
C 4	ECUV1H102KBV	0.001	1	I			
C 5	PQCUV1E104MD	0.1 S	1	C500	ECUV1H103KBV	0.01 S	1
C 6	ECEA0JKS470	47	i	C501	ECUV1H103KBV	0.01 0.01	1
			1	C502	ECUV1H680JCV	68P	
C 7	ECUV1C104ZFV	0.1					
C 8	ECUV1H270JCV	27P S	1	C503	ECUV1H103KBV	0.01 S	1
C 9	ECUV1H221JCV	220P	1	C505	ECUV1H270JCV	27P	1

KX-TC187AL-W								
Ref. No.	Part No.	Part Name & Description	Pcs/Set					
ACCESSORIES								
A1 A2 A2 A3 A4 A5 A6 A7	KX-A11BAXAL PQJA10059Z PQJA87S PQJS04S11Z PQKL10028Z1 PQQT11564Z PQQW12037Z PQQX12090Z	AC ADAPTOR TEL CORD (for Australia) TEL CORD (for New Zealand) TEL PLUG (for Australia) STAND S TEL CARD LABEL QUICK REFERENCE GUIDE INSTRUCTION BOOK (for Australia) INSTRUCTION BOOK (for New Zealand)	1 1 1 1 2 1 1					
P1 P2 P3 P4 P5 P5	PQPH89Y XZB11X40A02 XZB15X25A01 PQPD10405Z PQPK12672Z PQPK12672Y PQPN10645Z	PACKING MATERIALS PROTECTION COVER (for Base Unit) PROTECTION COVER (for Handset) PROTECTION COVER (for Tel Cord) (for Australia) CUSHION GIFT BOX (for Australia) GIFT BOX (for New Zealand) CUSHION	1 1 1 1 1 1 1					
TOOL								
Note: PQZZ12K1	PQZZ12K11Z 1Z is useful for servicing	EXTENSION CORD, 12P (It make servicing easy).	1					